



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

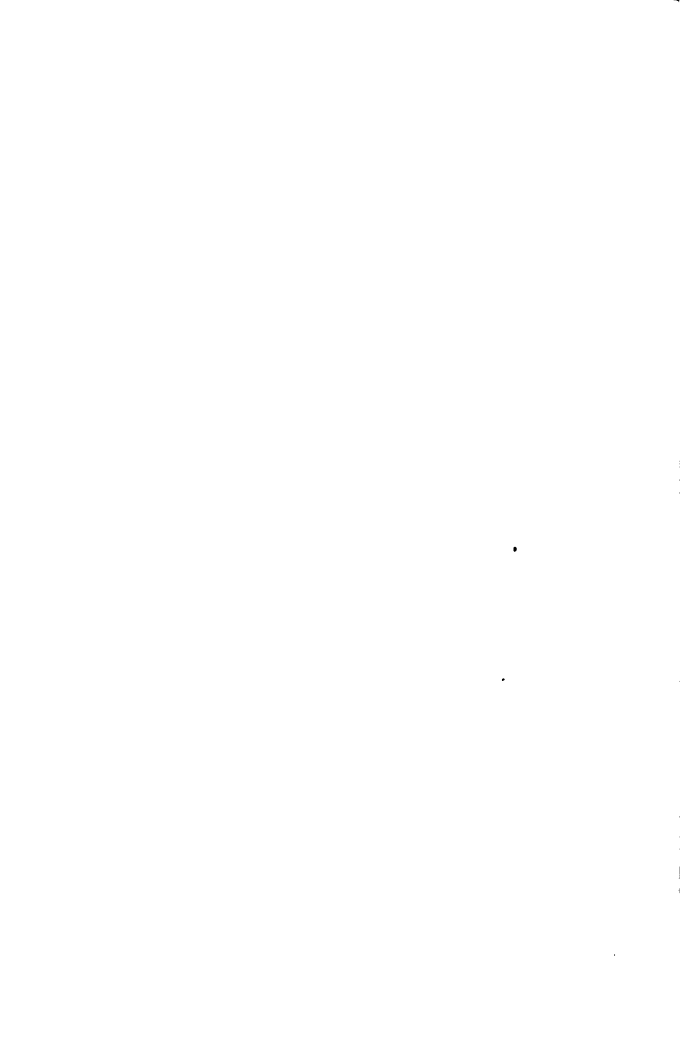
- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

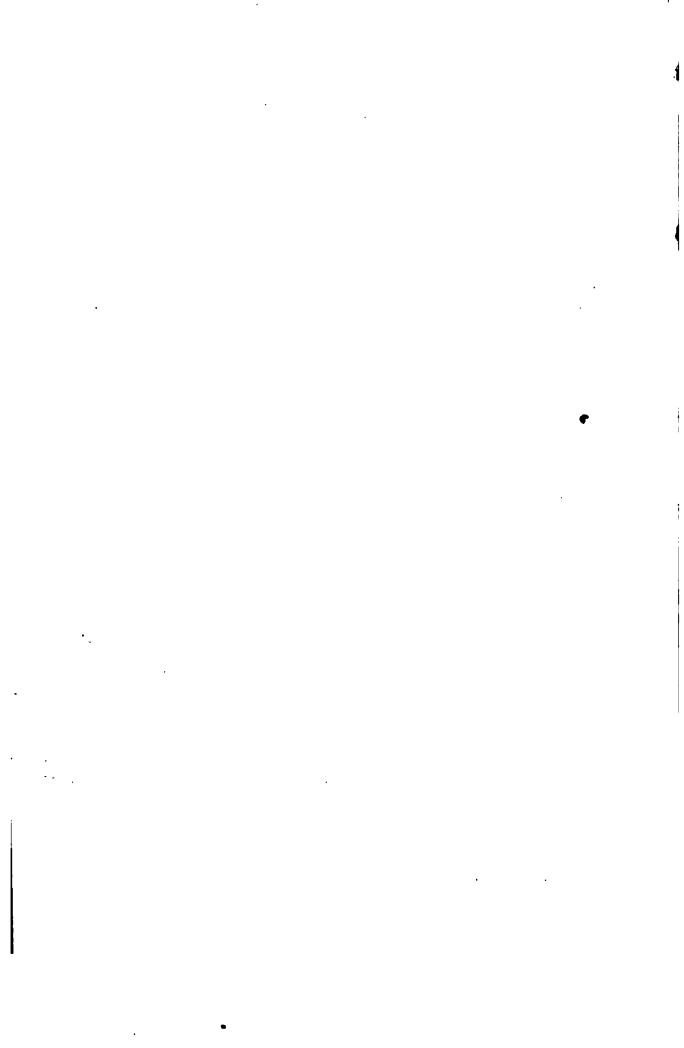
HAND-BOOK
OF
GARDENING
2/-







THE
HAND-BOOK OF GARDENING.



THE
HAND-BOOK OF GARDENING,

FOR

THE USE OF ALL PERSONS WHO POSSESS A GARDEN
OF LIMITED EXTENT.

THE TENTH EDITION, CONSIDERABLY ENLARGED AND IMPROVED,

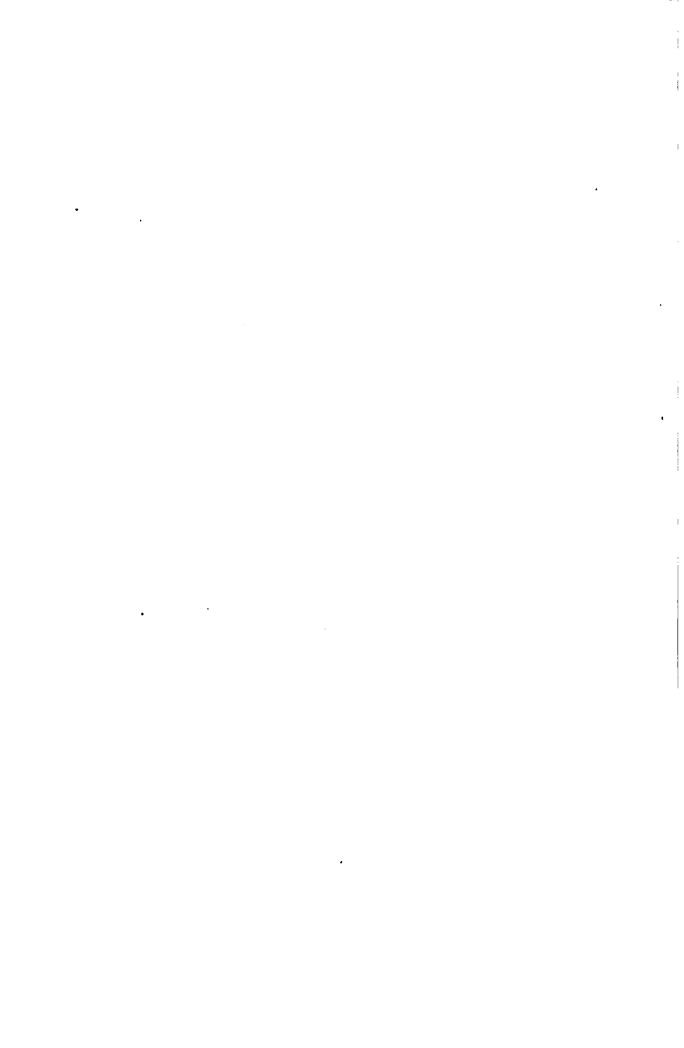
By EDWARD KEMP,

Landscape Gardener Birkenhead Park.



LONDON:
BRADBURY & EVANS, 11, BOUVERIE STREET.
1851.

141. C. 90.



INTRODUCTION.

IN an age when gardening, in all its branches, is becoming a fashionable pursuit, the press naturally teems with works, fraught with every information that can be desired, respecting both its principles and practice. The want, however, of a little manual of general and simple directions for the management of small gardens, was long felt, previous to the first issue of the present work ; and the numerous editions of it which have successively been distributed, proves that the public wishes were both anticipated and gratified by the efforts of the author to supply this desideratum.

It is needless to observe, that most works on

gardening are written for the members of the profession, or those individuals, at least, who have some knowledge of its principles. The present little treatise is not intended for the initiated few, but for the inquiring many; its aim is to convey all the most useful and valuable information connected with this most interesting subject, which is but elucidated and amplified in larger works. And while all technical phrases have been avoided or explained, its style has not been allowed to fall below that standard, which may safely and advantageously be perused by the most respectable classes of amateur gardeners.

To enhance its interest, and render it still more practically useful, the proprietors have the gratification of announcing that they have had the whole carefully revised by a professional gardener, and very considerable additions have been made to the practical portion of it. Particular attention is requested to the division which treats of the cultivation and management of flowering plants, very little of which appeared in any but the last edition. The present issue embodies a variety of further enlargements.

The great interest which now attaches itself to this most delightful branch of gardening, will doubtless render the new feature just mentioned peculiarly acceptable and valuable ; particularly as the directions herein contained are the result of the author's own experience, as well as that of many highly respectable amateurs. Selected lists of the most ornamental species of the different kinds of plants which can be easily procured, have likewise been furnished, and these, it is presumed, will not be found the least valuable features of the work.

The scientific portion, too, has now been completely re-arranged, and its matter rendered more consonant with modern discoveries and observation. It has, besides, been reduced to a more decidedly practical bearing, in conformity with the general spirit of the work, which aims to impart sound and *useful* information rather than mere amusement or pleasure.

The proprietors hope that nothing will now be wanting to render this little treatise as complete as could be desired, as every branch of gardening which can be performed without the assistance of

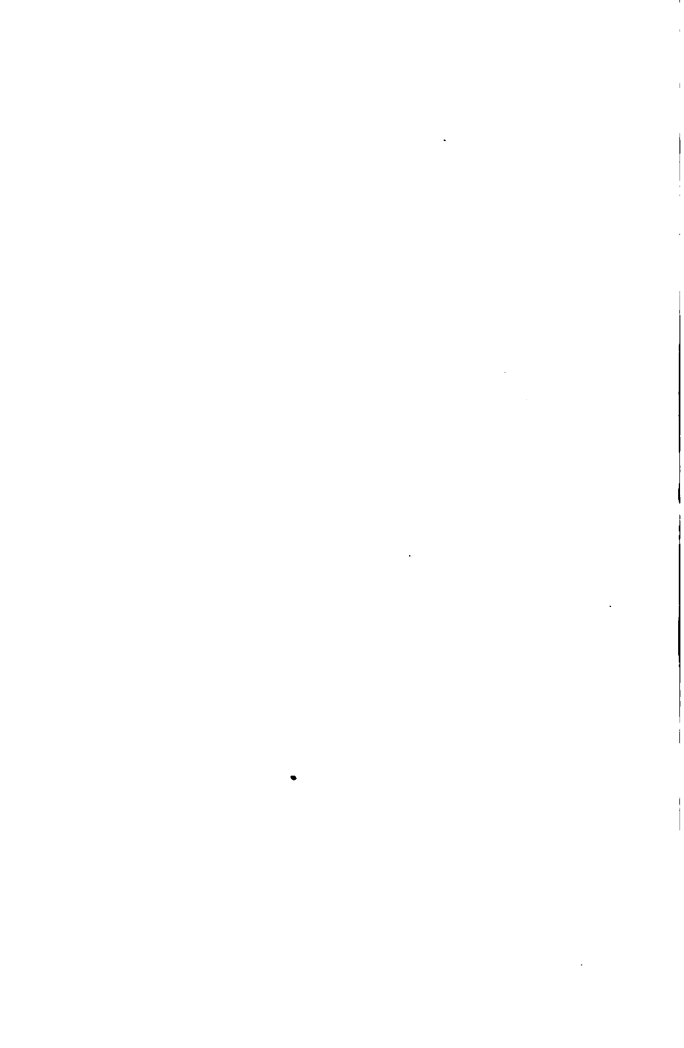
a professional gardener, has been treated of in the most simple and practical manner possible. Those subjects on which a diversity of opinion exists, have either been fully stated and left to the decision of the reader ; or, that opinion has been adopted which experience has proved to be the most consistent and correct. In all cases, nothing has been asserted but what may safely be relied upon, and the importance of this will no doubt be fully appreciated.

It appears necessary that something should be added on the laying out or disposition of a garden ; but as this must depend entirely on local circumstances, and on the means or wishes of the occupant, it is impossible to furnish any specific directions. All that can be said, therefore, on this subject, is that the ornamental part of a garden should always be nearest to the dwelling, and, if possible, in the front of it ; and that the part devoted to kitchen produce should be situated at as great a distance from the house as the extent of the garden will permit, provided it does not exceed one or two acres. If it is bounded by a wall or fence, some shrubs should be planted im-

mediately within it, to conceal the boundary, and all further arrangement of it can be conducted to suit the wants or wishes of the owner or tenant.

In the smallest gardens, a portion of them should always be devoted to ornamental purposes, as, so far from the ground thus occupied being wasted, the cultivation of flowers, and the management of a flower-bed or border, improves and elevates the moral character of the individuals exercised upon it, to a degree almost inconceivable. And if no other good effect results from it, it will at least afford a most delightful source of recreation and amusement.

April, 1850.



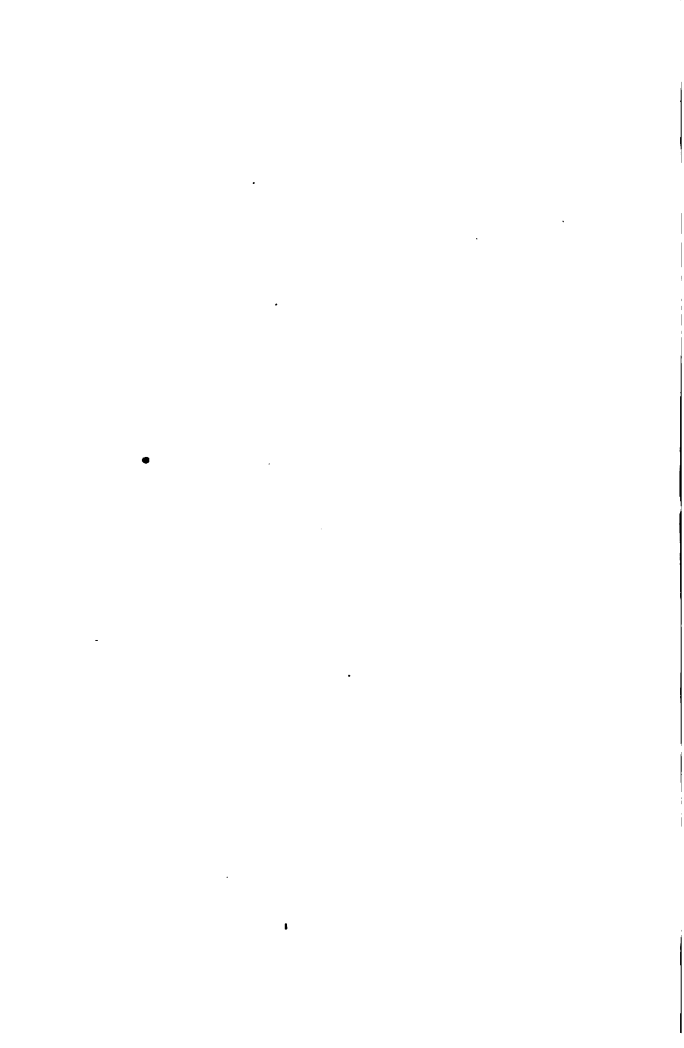
CONTENTS.

	PAGE
A. THE ART AND SCIENCE OF GARDENING	1
B. THE SCIENCE OF GARDENING . . .	2
I. THE ORGANS AND PARTS OF PLANTS . . .	2
1. Leaves	3
2. Roots	4
3. Spongelets	5
4. Pores	6
5. Sap and pulp	8
II. THE AGENTS WHICH AFFECT PLANTS . . .	9
1. Heat	9
2. Light	10
3. Air and gases	11
4. Water	12
5. Electricity	13
6. Weather	13
7. Soils	14
8. Manures	16

	PAGE
III. THE PRINCIPLES OF CULTIVATION . . .	19
1. Draining	19
2. Operating on ground	20
3. Watering	21
4. Propagating by seeds	22
5. Propagating by division of the roots	25
6. Propagating by offsets, layers, and suckers	27
7. Propagating by slips and cuttings	30
8. Propagating by grafting, &c.	36
9. Planting	38
10. Pruning	38
11. Flowering and fruiting	39
12. Sheltering and protecting	40
13. Rotation of crops	41
IV. THE ACCIDENTS OF CULTIVATION	41
1. Tools and conveniences	42
2. Diseases of plants	43
3. Injurious insects and animals	44
C. THE ART AND PRACTICE OF GARDENING	47
I. ON REARING KITCHEN VEGETABLES	47
I. <i>Roots</i>	48
1. Potatoes	48
2. Carrots	53
3. Parsneps	55
4. Beet	55
5. Jerusalem artichokes	56
6. Turnips	57
7. Radishes	59

CONTENTS.**XV**

	PAGE
3. March	183
4. April	184
5. May	185
6. June	186
7. July	187
8. August	188
9. September	190
10. October	190
11. November	191
12. December	192
E. THE SUCCESSION OF CROPS.	193



THE HANDBOOK OF GARDENING.

A. THE ART AND SCIENCE OF GARDENING.

GARDENING may be treated either as an Art or a Science.

The Art of Gardening consists in the employment of all those means necessary to rear, develop, nurture, and gather in the various crops, whether of herbs, fruits, or flowers.

The Science of Gardening is founded on a knowledge of the nature, constitution, habits, and wants of plants, and on the way in which the agents and processes of Nature affect them. It should, therefore, teach the general application of the facts thus known to all the operations of culture.

An individual who has no acquaintance with the Science of Gardening, conducts its numerous processes very much in the dark, and is successful or otherwise, chiefly as accident may determine. He sows, plants, and labours, as his forefathers have done before him; and the simplest derangement of the circumstances which have previously caused him success will disappoint and frustrate all his expectations.

The mere book-gardener, on the other hand, who is

conversant only with theories, finds himself continually still more at a loss, and liable to perpetual failure ; for the commonest results of every-day experience being unknown and neglected by him, nothing that he attempts can prosper.

Hence, the teachings of Science, and the precepts of experience, are alike necessary to enable any one to garden satisfactorily, and to correct his practice according to the varying conditions in which he finds the objects of his care placed. To supply both these desirable features is the purpose of the present work ; and we shall commence with Science, as the foundation-stone of the building.

B. THE SCIENCE AND PRINCIPLES OF GARDENING.

To understand correctly the way in which plants live, and are nourished, and can be multiplied, their principal parts and properties must be examined. We shall only, however, notice such of these as it is really indispensable to consider in order to give a clear view of their cultivation.

I. THE ORGANS AND PARTS OF PLANTS.

As with the animal system, every vegetable is furnished with certain parts or organs which are essential to its health, its preservation, or its very existence. An organ is a part of a plant which occupies a certain position, and fulfils certain offices in its economy, and to which a particular and distinguishing name is applied. Stems, leaves, roots, flowers, are such organs ; and some of these have subordinate parts, by which special and peculiar offices are performed. The spongelets or tips of the roots—the pores, situated on most portions of the external surface—the sap, which is like the blood of the plant—and the alburnum, which is the incipient layer deposited yearly beneath the bark of woody plants, to increase their bulk—are examples of such parts.

1.—*Leaves.*

These, as is well known, are the upper appendages of plants, which give them nearly all their beauty, and are the means by which they expand and become strong. They are the instruments of elaborating all food, and giving off its watery parts. It is in them that the processes analogous to digestion and assimilation in animals are carried on. Through the action of light upon them, they separate the nutritious from the watery portions of the sap, and discharge the latter into the air, while they restore the former to the branches and stems. When, therefore, by birds, or insects, or disease, or the browsing of cattle, a plant is stripped of its leaves, it will either become weak and sickly, or altogether die. And the more abundant and healthy the foliage of a plant may be, the more vigorous and luxuriant will be its general growth. To pluck leaves from plants with the view of aiding fruit or wood to ripen, or at all to anticipate their falling off in the Autumn, is a great error; for it is through the leaves alone that both wood and fruit are enabled to reach maturity.

It must not be supposed, however, that encouragement should be offered to the growth of leaves in all cases. A fruit tree or a flowering plant may sometimes settle into a thoroughly unprolific state, in consequence of undue luxuriance in leaves and wood. The corrective will then be found, not in reducing the number of leaves by thinning them, but by pruning the branches, or descending to the source of the evil, and impoverishing or pruning the roots. This is merely mentioned to show that, although leaves are most necessary, and their action beneficial, they may, in particular instances, become too numerous, and thus do mischief. There is a kind of balance preserved by Nature in plants, between the leaves and the roots; so that where the one is particularly strong or feeble, the others will be sympathetically strong or feeble also. Whatever tends to increase or diminish the one will therefore similarly affect the others. Roots may be very vigorous, and require pruning, as already suggested, because they occasion the production of too much wood and foliage. And because,

from removal or other causes, roots may sometimes be curtailed or mutilated, the branches should in such cases be slightly pruned, to restore the balance between roots and leaves.

2.—*Roots.*

Situated at the base of a plant, these are the chief means of supplying it with food, as well as maintaining it in its position. They may be either fibrous or simple; and according to their capacity and disposition to form numerous little branches, will the plant that possesses them be either easy or difficult to transplant. Trees or plants that have the habit of producing simple roots—"tap-roots," as they are usually called—are among the most uncertain to remove, unless they are transplanted young, when they will often be all the better for some purposes if they have the tap-root shortened, and are thus compelled to throw out side rootlets. The whole of the cabbage tribe are of this description. Other kinds of plants are thrown much sooner into fertility by one or several removals, because the reduction of the roots checks any propensity they may have to form superfluous wood and foliage. This is the case with most fruit-trees, and with many flowering plants.

Roots spread themselves either horizontally or downwards. Some plants have a natural leaning to either the one or the other of these habits, and should be planted in deeper or shallower soil accordingly. But in general, those which have a great depth of earth to grow in will be most luxuriant, while such as have their roots necessarily kept near the surface of the ground will be more fruitful and productive, as shall be hereafter explained.

In very poor sandy or gravelly soils, and especially in pure sand or gravel, the roots of plants have an interesting tendency to multiply themselves, and produce a profusion of fibres; as if for the purpose of picking up nutriment from a greater multitude of quarters, when it becomes more scanty. They likewise, in such positions, occasionally form small tubers on the roots, apparently to enable them to lay up moisture in themselves against the occurrence of a particularly dry period. The former of

these facts is instructive as well as pleasing, for it indicates that shrubs or trees reared on a light, poor, and shallow soil, will have the greatest quantity of root-fibres, and thus be best fitted for transplanting. We have recently observed, however, with some astonishment, that trees planted on mere sand-hills, near the sea-coast, form scarcely any fibre, but send down long succulent roots to an immense depth—evinced a wonderful power of adapting themselves to circumstances; for, if they were merely to make lateral fibres in such a spot, like the more humble herbaceous tribes, they must soon perish; whereas, by striking down so deeply, they have the means of obtaining constant moisture in the driest weather.

3.—*Spongelets.*

At the top of every root or root-fibre there is a growing succulent point, like a piece of half-formed wood, which botanists call the spongiole or spongelet, and which is the medium by which the great bulk of the plant's nutriment is imbibed. This spongelet, which is just an extension of the half-elaborated sap or pulp before it is hardened, is extremely tender, porous, and absorbent, and is paler, more fleshy, and transparent than the older parts of the root. It takes up water and other liquids, and immediately conveys them throughout its substance as a sponge does. It will receive nothing but liquids, though it does not reject anything they may have in solution. This is a fact of considerable importance, for it shows that whatever is intended for the food of plants must be capable of being easily reduced to a liquid state. Manures, therefore, or chemical applications, must either be readily reducible by water, or be rendered so by the addition of some acid or other ingredient.

As the spongelets play so very essential a part in the growth or sustenance of vegetables, it should always be a leading object to preserve and multiply them, where vigorous development is desired, or to lessen their number in case the plant is becoming too exuberant. In removing some plants, therefore, if balls of earth are attached to their roots, a large portion of the spongelets will remain

uninjured, and they will thus experience a less decided check. Or, if the increase of the plant's subsequent capacities for enlarging itself be sought, transplantation, with its necessary destruction of many spongioles, will produce a tendency to throw out a far greater number, and thus give the means of future extraordinary growth. It is pretty generally known that most vegetables possess the power of renewing and indefinitely multiplying their root-fibres, on which the spongelets are situated, wherever these get severed or removed. At the same time, the reduction of the number of spongelets will often, by staying undue luxuriance, induce a state of greater fertility, or entirely bring it about in plants that have previously been barren.

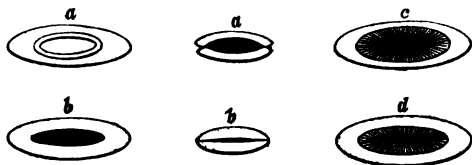
Newly planted things, being deprived for a time of a large proportion of their spongelets, require a larger supply of liquid food if it be in the growing season, that the spongelets which remain may take up a greater quantity of it, and thus make good the deprivation. It is for this reason that the early autumn is considered preferable for planting all kinds of trees and shrubs, because there is not, for a long period afterwards, any demand upon their resources, and they are able to form new spongelets before these are required. The beginning of the spring, or just before they acquire their full power of vitality, is the next best season, as they then have all the strength of the renewed vital energy to enable them rapidly to form new spongelets.

The excretions supposed to be given off by plants through their spongelets, and which were thought to deteriorate the soil, and render it unfit for a second crop of the same kind, are now proved to have little or no existence. The cause of the deterioration of soils by particular crops, for others of a similar kind, will be found in the fact that certain plants withdraw peculiar gases or elements from the earth, and these have again to be supplied before similar plants can be satisfactorily grown on the same soil.

4.—*Pores.*

In addition to the spongelets as a means of taking up food, plants are dotted all over the leaves, stems, and even

roots, with numerous minute openings, called pores, which are often smaller than pin-holes, and by which liquid food in the soil, or that which is floating in the air, is freely received. Until very recently it was believed that the nutriment of plants was obtained almost solely through the roots. But it has now been proved that they *can* exist *wholly* on atmospheric supplies, and that they draw very largely from this resource at all times. The pores, therefore, are no doubt the means through which such nourishment is appropriated. But they are also the agents by which evaporation is carried on, and probably air admitted. Those on the leaf undoubtedly lead to small air-cells, and they are possibly similar to the nostrils of animals, or the pores in the human body, or rather to the breathing pores in the sides of insects. The subjoined figures will convey a good idea of the shape and nature of pores, as existing on the leaves of plants ; and their resemblance to such as are found in the sides of insects.



Pores greatly magnified : *a, a*, pores of plants open ; *b, b*, the same shut ; *c*, breathing pore or spiracle in the side of a caterpillar open ; *d*, the same shut.

These figures represent the pores to have raised lips, varying in form, which appear to shut when they are wetted, and also in the dark, but open in dry air, and when exposed to sunlight. Through these pores the plant gives off two-thirds of its superfluous water, in a similar manner to that in which animals do the same by the breath and by perspiration. They perform, in fact, much the same offices as the pores of the human body, which are easily proved

to imbibe as well as to exhale moisture, by plunging the hands in water when suffering from thirst.

As all manner of cutaneous, and even internal diseases, result from the obstruction of the pores in the animal system, so plants can never be healthy when their pores are in any way prevented from acting regularly. An undue pressure of stiff soil about the roots, and a deposit of soot, dirt, and dust on the leaves, are alike injurious. Rains will often remove all the latter impurities from plants that are growing in the open ground ; but a powerful occasional syringing, or washing with a garden-engine, will be exceedingly useful in dry, dusty weather ; and for plants in pots, that are kept in the house, the same process, or sponging the leaves carefully, will be highly beneficial at times.

5.—*Sap and Pulp.*

The liquid matters imbibed by the spongelets and pores of plants, and transmitted through their system, acquire, as soon as appropriated, the name of sap ; and after the two-thirds of the more watery constituents of this have been thrown off by evaporation, the remaining third, which is like the blood of animals, will be consolidated into a thicker consistence, termed pulp. The sap of plants, then, is the food which they have taken into their system in its crude state. Being diffused through the stems, and elaborated in the leaves, and the mere water discharged through the pores, it becomes pulp. This last, being the vital part and substance of plants, determines, by its abundance or deficiency, their healthiness and strength. If too little solid matter is taken up by the sap, (as will be the case in poor soils,) the plants will be weakly and yellowish ; or if the amount of light and air supplied to the plants be insufficient to separate the watery from the substantial parts of the sap, and to bring it to its proper consistency, the shoots will become feeble, drawn, wanting in colour, and the leaves pale and tender.

Pulp is chiefly composed of the carbon or charcoal taken up by the sap, and is itself of a dark blue colour ; but the transparent tissue of the leaf in which it is enclosed being more or less yellow, the combination of the two colours

forms green, as blue paint mixed with yellow produces green. This will account for the yellow colour of leaves when the pulp is deficient.

II. THE AGENTS WHICH AFFECT PLANTS.

1.—*Heat.*

Before ever sap can be extracted from the soil, or set in motion afterwards, it must be acted upon by heat, which is the prime agent in promoting the growth of plants. It is present both in the soil and in the air, and is everywhere diffused. In proportion to its prevalence, (other conditions being available,) the growth of plants will be either rapid or extensive, or the contrary. This accounts for the comparative dormancy of plants in winter or cold weather. The suspension of the flow of sap at the beginning of winter is erroneously ascribed to the descent of the sap at that season, when, in fact, it is solely occasioned by the absence of a sufficient degree of light and heat. If these and moisture were duly present, perpetual growth would be the result, as it is, except during the dry season, in tropical climates.

Heat is distributed pretty equally among all things on the earth's surface, by a process somewhat similar to that of water always finding its level, and which is termed radiation. Thus, it will invariably pass from a warm substance to one near it which is colder, and all the more rapidly if the two things are porous and in contact. The warm ground, for instance, will give off its heat into the cold air, till the heat of the ground and that of the air become equalised; but the air will not communicate its heat so readily to the ground, as it is a property of heat to be continually ascending, and passing off into space.

As plants derive their food mainly from the soil, its heat should be in some measure correspondent to that of the atmosphere, or they will increase in length, but not in strength. This is one reason why cold wet soils are generally unsuitable. The roots do not grow in proportion to the branches and leaves.

Cold is merely a state in which, by the process of radiation, heat is absent. Plants always possess a certain

proportion of heat, which is necessary to their vitality ; and soils are in winter usually warmer than the air. It is in preventing this heat from flying off into the air, and not in imparting fresh heat, that the true philosophy of shelter consists.

2.—*Light.*

Without light, heat would merely expand the parts of plants : light must elaborate the sap into pulp. Plants that are excluded from light become drawn and weak, as under the shade of trees or walls, and in dwelling-rooms. Even grass, which is endowed with such a wonderful power of life, dies under the thick shade of trees. Plants naturally turn to the light, and grow towards it, their tissues becoming more elaborated and contracted on the side from which light is supplied : hence their feebleness and one-sidedness. If plants be placed in a warm cellar, where light is only supplied from a single aperture, they will always grow in that direction if the rays can reach them.

There can be no fruit or flowers without light, because none of the parts of plants can be fully and properly matured ; and the flower or fruit-bearing process is the result of the last stage of maturity. Greenness, and all high colours, are the result of light ; leaves have only a sickly yellow hue without it. But it must be remembered that flowers, once developed, will fade sooner when subjected to strong light, which will rather throw them into fruit. When flowers, therefore, and not fruits, are desired, a little shading, after the first blossoms have expanded, will prolong their beauty.

The exclusion of light produces *blanching*, as in the familiar case of lettuce, endive, and celery ; but it gives additional succulence and crispness, and tenderness, as with the sea-kale. All vegetables, therefore, that are used for their juiciness, or eaten raw as salads, or in which much fibre would be a defect, should be grown quickly, with plenty of warmth, but comparatively less light.

Want of light is often the real cause of evils which are popularly ascribed to want of air, though both combined may occasionally be acting. Light may, however, be prejudicial to plants in certain stages, as after fresh planting

or potting, when it stimulates them more than their crippled roots will bear. Dull weather is, therefore, best for both potting and planting, and a little shade after either process may often be beneficial.

3.—*Air and Gases.*

Air is as necessary to plants as to human beings, since they both exhaust it of its health-producing influences, and probably both vitiate it to some extent, as far as themselves at least are concerned. There can be no general healthiness or robustness without fresh air. The roots of plants require to be within reach of it; consequently, where they are tolerably near the surface, and in porous soil, the plants are much more fertile. Very deep soils, which attract the roots away from the influence of air, tend only to the production of leaves and branches. Air fills the soil as well as the atmosphere, and exists in plants in little cells, which appear provided expressly for it.

It is said to be valuable as a mechanical agent, in agitating the different parts of plants, and keeping them healthy and hardy, in helping off their watery evaporations, and in removing impurities. But it is most useful in conveying gases to them, as a very considerable quantity of the gaseous food of plants resides in the atmosphere, and is communicated to them directly through their pores, or through the soil to the roots; besides being precipitated upon them, or forced into the ground for them by rain, snow, &c. Oxygen and nitrogen, the food of plants, are the chief constituents of the atmosphere. Carbon, also, which is essential to plants, is derived both from the air and the soil. It exists most abundantly where population is densest, and the various processes of life most thickly carried on. Plants and trees in large towns must therefore tend materially to improve the air, by relieving it of its carbon.

A close frame or hand-glass, where little or no fresh air is admitted to dry up the juices, and that which it contains is kept slightly moist, is the best condition for newly potted plants or cuttings. Quiet moist weather is likewise always best for planting, as winds seriously dry

the roots of plants during the operation, and assist in abstracting too much of their juices after they have been removed.

Plants convert the oxygen and carbon which they receive from the soil and air into carbonic acid, which they exhale at night. This being a deadly and dangerous gas to human beings, plants or flowers are not considered healthy in a sitting or bed room during the night. In the day, they give off oxygen, especially in the morning, which is reputed to render the morning air so fresh and exhilarating. They are very useful in absorbing from the air the carbon which is so injurious to animal life, and they purify stagnant water in the same way.

4.—*Water.*

This agent is composed of two parts of hydrogen gas and one part of oxygen. In its simple state, it is therefore not unfitted partially to sustain plants. But it is very rarely found thus free from some other ingredient, and is capable of taking up all the various matters which go to preserve and to develop vegetable life. It is, in short, the principal medium by which plants feed.

Water exists both in a liquid and a fluid state, according as it is found in or upon the earth or the atmosphere. It is always more or less naturally present in soils, and is discharged from the atmosphere, to which it travels by means of evaporation, in the form of rain, dew, &c. Without water, vegetables would speedily die. It must therefore be supplied when it is naturally lacking, and to such plants as are kept in an artificial state. The soil in which plants grow should be constantly moist, but not wet. In extremely wet soils, there can never be sufficient heat or air, and the vessels of plants placed in them will soon become turgid and diseased. This is the basis of all draining, whether in the natural ground, or in pots.

A great variety of nutritive matters are conveyed by nature to plants through the medium of water, and may be applied artificially by the same means. As only liquids can be absorbed, nothing that will not dissolve in them can be expected to enter the plant, or do it a particle of good.

Water is very necessary and very refreshing to the leaves of plants, to wash away dust and dirt from them, and keep their pores in healthy action ; besides checking any extravagant drain on their resources in dry weather. Rains and dews are beneficial in this way, for the most part. And in artificial watering, whether given to plants in the open ground or in pots, syringing over the leaves will be an important addition, without which common watering at the roots would be of *comparatively* little avail. But it should be seen that the water, however applied, is not of an injurious nature, and does not contain deleterious matter.

5.—*Electricity.*

In the absence of any definite knowledge of this mysterious power, it can only be mentioned as a thing that acts decidedly and strongly upon plants. There can be no doubt that it promotes healthiness, when present in only its ordinary condition and quantity. But it also *seems*, at least, to occasion disease, and to be in some sort productive of what are popularly termed “blights,” which are sometimes in no way attributable to insects. How far it may go, in its usual state, towards composing or upholding vegetable life, it is impossible to say. Neither can it be determined, by any means at present known or understood, to what extent (if at all) it has been productive of the disease which has so unhappily become notorious as the “potato blight,” though this is most commonly ascribed to atmospheric influences. But as the further discussion of this principle could not tend to any positive practical result, it may be dismissed with a simple reference to the known potency of its action on vegetable life.

6.—*Weather.*

The wonderful variations of the weather consequent on atmospheric changes, and forming the climate of a district, exert a powerful agency upon plants, and require to be well considered and studied. The barometer, thermometer, and even the hygrometer, to measure the heat and moisture and calculate the changes of the atmosphere,

will be useful instruments to the cultivator, as indicating what the senses, however nicely tutored, can never so accurately make known. The occurrence of frost, reminding him of the need of protection for some plants,—of rain, admonishing him to gather in crops that require to be stored while dry, or to plant such as will be benefited by moisture,—of gales of wind, pointing out the necessity of shelter and support,—may thus often be foreseen and provided against. A few simple rules, such as a good almanack will furnish, relating to the leading signs of the weather, may be of great service in gardening.

Frost commonly occurs when the sky is clear and during the time the moon is above the horizon, or after hail storms. A lurid redness in the sky about sun-rise, or a very sudden and extensive fall of the barometer, portends violent winds. Rain generally follows a heavy gale, or a sudden fall or rise in the temperature; and cold showery weather mostly succeeds to thunder storms. In summer, rain seldom comes with the first cloudiness after a week or two of drought, but is lingering and tardy in its arrival. Very low clouds, however thin, are commonly charged with rain. Near tidal rivers or the sea, a continued rain may be expected if it commence steadily just about the occurrence of high water.

Such rules might easily be extended to a great length, were they of more universal application; but different localities have such various weather symptoms; and general directions of this sort are not entirely and at all times to be depended on. They are only useful as common (not invariable) guides.

7.—*Soils.*

These, as far as the mere matter of which they are made up is concerned, are of little consequence in themselves. But they are of the highest value as the means of conveying other things, and may contain ingredients which plants will largely feed upon. They may be considered with reference to their texture, and their capacity for being pervaded by roots, or for receiving liquids and gases and transmitting them to the plants.

The mechanical properties or textures of soils are of first concern. No soil that is not open, and easily pervaded by air and moisture, and comparatively unretentive of the latter, will ever be fit for growing plants in unless it can be reduced to a better state by art. Stiff and unctuous clays, with close and fatty bog earth, are entirely unsuitable for the cultivation of plants, until they are thoroughly broken up, and drained, and pulverised, and mixed with lighter ingredients. The mere draining and working of bog soil will do a great deal towards improving its texture. But clays will require long tillage, and the liberal use of such things as coal-ashes, sand, lime and stone rubbish, light manures, or sandy peat, to bring them at all into a good condition. And even with these, much time and patience will be demanded. Throwing them up in ridges during autumn, and leaving them thus till spring, exposed to the action of the winter's frosts, will be greatly conducive to their pulverisation. Very light sandy soils, on the other hand, possess faults of texture of an opposite description, though they are much more easily remedied. They give off water too freely, admit air too thoroughly, and become parched and dry in the summer, not being able to sustain any crop whose roots lie near the surface, or any strong-growing kind of plant. Their defects may be corrected by the application of marl and other clays, and by the use of such manures as cow and pig dung. They should never be ridged up in winter, nor turned over more than is really necessary.

The best kind of soil for garden purposes is a moderately strong light-coloured loam, or such an alluvial earth as is produced by deposits from streams and rivers. This will be open, if properly worked, and yet never become dried up in ordinary summers. It will possess sufficient substance not to be soon impoverished, and may at any time be got into new "heart" by manure. Chalky soils are often, however, good; and possess the merit of keeping away many insects. But soils that are gravelly are mostly poor, and easily dried up, and unsatisfactory as to produce, and obstructive of the roots of growing crops.

The mineral part of the soil, which is composed of clay,

lime, and flint-earth in the form of sand and gravel of various degrees of fineness, together with, sometimes, magnesia, iron, and a few other metals, contributes little or nothing to the nourishment of plants. These portions of the soil appear to be chiefly used mechanically or chemically, in improving the texture and distributing the more nutritive parts, or in mixing with other things, or operating upon them, to produce nourishing compounds.

On these principles, we may easily account for the barrenness of stiff clays, dry sands, and, more particularly, soils chiefly consisting of granite sand, as those in Arran, and near Plymouth; while in the instance of sand or clay from basalt or whinstone, as well as from limestone and chalk, when mixed with other soil, the carbonic acid gas tends to promote greater fertility, as in the Lothians, Ayrshire, and Kent. Volcanic rocks, as in the Campagna of Rome, are very fertile for the same reason. No mixture, then, of clay and sand will be productive, without limestone, chalk, or basalt, (that is, whinstone,) and, more particularly, without decayed plants and manures.

Some mineral substances, such as iron, are injurious to soils, and, perhaps, all the metals are so when combined with oxygen gas or acids. Many good soils, it is true, contain iron, known by the reddish rusty colour it imparts; but their fertility appears not to be owing to the iron, but to exist in spite of it.

8.—*Manures.*

There is no branch of plant-culture in which a more thorough change has been effected of late years than in the application of manures. The old fashioned, substantial, simple manures have now very much given way before the use of such as are highly concentrated, or are compounded chemically, or are administered in a liquid state, or contain some single ingredient, which the particular crop to be grown appears most to require.

Two or three very important results have followed from this alteration in the system of manuring. First, the new kinds of manure are generally of easy application. They travel in a small compass, and may often be put on by the

hand. A great deal of wheeling or carting is thus saved. Secondly, they frequently have the ammonia which they contain so fixed by acids as to occasion a prodigious saving of this most effective element, and to avoid altogether the disagreeable and noxious odours common to the older manures. Thirdly, they are sometimes made to contain or combine the element or elements on which particular crops almost entirely feed ; the researches of chemistry having laid bare, to some extent, the constituents of many plants, and their consequent requirements. These are all properties of the highest interest and the greatest value.

But there remains another view of the case, which it will not be wise to neglect. Artificial manures seldom act mechanically on the soil. They do not improve its texture. Nor does their influence often last long. It is transient, and extends but to one or two crops. They cause, moreover, little or no additions to the soil. The available parts for cultivation do not acquire any extra substance or depth by their use. They are likewise too stimulating for some crops, especially permanent ones, and occasion extravagant growth, without corresponding fertility. On all these points, therefore, the commoner manures must be deemed yet in advance of those more recently devised.

On the whole, it will be well to adopt such new manures as have been ascertained to be good, (though there are numbers that are perfectly worthless,) as a general rule, for temporary crops ; with the occasional use of the more solid kinds, and the selection of these last alone for fruit trees and more lasting crops.

From the excrements of various animals, mixed with partially decayed vegetable matter, such as straw, the best possible manure may be obtained. Sheep dung and that from birds are among the most powerful, and may be applied simply without any admixture. Horse, cow, and other manure will be improved by mixing them with vegetable substances, and fermenting and turning them several times before using. The addition of a little lime will render them more thoroughly and more immediately efficacious. They should be covered up with earth while

fermenting, that less of the ammonia which they contain may be lost.

Guano is the dung of birds, obtained from those portions of sea-coast, whether in South America or Africa, where particular species abound and congregate, and where the dung has been deposited and accumulating for ages. It is, when obtained pure, an excellent but expensive manure for a single crop, and may be applied broadcast at the time of putting in the crop, or sown along the drills with the seeds or sets, or put on just as the crop is coming through the ground. The last is generally the most economical process, and the ground should be hoed over a few days after it is finished.

Bone-dust is one of the best manures for firm soils, that are not deficient in depth, and it has the merit of being clean and readily applied. It also lasts a considerable time. Crushed bones, which are in larger pieces, will be even more durable, and are very effective in facilitating drainage.

Liquid manures are exceedingly useful on a small scale, and especially in pot-culture. They may consist of urine largely diluted, or the soakage of a dunghill less freely reduced, or a mixture of a good handful of guano with a couple of gallons of water, or any of the same processes extended to the required quantity. They can be applied safely to growing crops, and will produce a speedier and a more marked effect than other manures, because the nutritive matter is already in a state of solution. A great deal may be done in this way in small gardens.

More artificial manures will contain, generally, some solution of the alkalis, (soda, potash, or ammonia,) saturating any neutral substance, to render them of convenient application ; or they may be of a more compound nature. As a rule, these three elements, being those upon which plants are more largely nourished, will form the most certain bases for manures.

The properties of manures are to stimulate and excite the system of plants into stronger and more luxuriant growth, and, in general, if but moderately employed, to increase their productiveness. Great caution is, however, necessary in adapting the quantity and quality to the

condition of the ground or the plants, and to the objects sought to be obtained. Manures are not usually conducive to a freely flowering condition, unless the soil be very poor indeed, or the plant be much cramped and impoverished in a small pot. And liquid manure will then be most appropriate. Fruit trees usually require manuring, but it will depend much on their individual habits and character. The more highly cultivated the state of any plant, or the more each particular variety owes its perfection to the highest culture, the more likely it is, in the abstract, to want frequent and liberal manuring. Such are some of the very finest vegetables and fruits, and the more richly developed among florists' flowers.

III. PRINCIPLES OF CULTIVATION.

It is of little use to know of what plants consist, and how they live, and to what influences they are subjected, if the means by which this knowledge is to be generally acted upon and applied be not also understood. The former may be the basis, the latter must be the superstructure. And although sundry processes may already have been incidentally noticed or explained, they either require fuller elucidation or putting in different lights.

1.—*Draining.*

This may almost be called a modern practice, for it is but lately that it has come at all conspicuously into vogue. It is, however, one of the most decided advances which recent art has made, and its advantages will be incalculable. It will not be every garden that requires draining. Some may be composed of soil that is very light and dry, and others may have a sufficient slope to carry off all surplus water. But where the ground is flattish, and has the slightest tendency to stiffness, draining will produce an immense improvement to the crops, and to the comfort of working and walking in the garden.

The first point to be attended to is to drain pretty deeply.

Shallow drains are never satisfactory, and often come in the way of the spade. Three feet, or even three feet six inches will be about the right depth, with the main drain three inches lower. The drains should follow the natural fall of the land, and have a tolerably good fall, which can be obtained by cutting them a little deeper at one end where there is no slope in the land. They ought to be three inches wide at the bottom, and fourteen or fifteen inches at the top, the main drain (which may discharge itself into the house drain or any other outfall that can be had) being made a little wider. Where tiles can be procured, those with a flat bottom are the best, otherwise they will require a slate sole to rest upon. Tiles of two inches diameter, and three inches for the main drain, will be sufficient. In the absence of tiles, each drain may be filled to within fifteen inches of the surface with old brick rubbish that is not too small, rough stones, broken earthenware, cinders, strong gravel, or broken rock or rubble in a rocky district. A few branches may then be laid over each, and the same materials should be placed over tile drains to within a like distance of the surface. The drains may be four or five yards apart, in parallel lines, and the main drain along one boundary.

Plants in pots require special attention as to draining, for they are in a more artificial state, and are liable to be much injured by superfluous water. In addition to putting plenty of drainage in the bottom of the pots, a few small pieces of broken stone or brick, with lumpy fragments of decayed turf or peat, may be mixed sparingly with the soil, to perfect the drainage.

2.—*Operating on Soil.*

Trenching should always follow draining, or the latter will act but partially. Unless the ground be stirred pretty deeply, half the effect of draining will be lost. Both must be done in the autumn or early part of the winter, and the ground will then be in a good state for cropping in spring. These and all other operations on ground should always be done when it is in a moderately dry state. If it be worked and trampled while wet, especially when it is

of a stiff nature, it will coalesce into a kind of crust, which will greatly spoil its texture.

Manuring may be done in early winter when the ground is somewhat frozen ; as the material can then be wheeled on with greater ease, and the ground and paths will be less cut up. But the manure should be dug in directly the frost is sufficiently gone, or it will lose much of its virtue by the exposure. Digging should always be deep and thorough, since it changes and incorporates the soil better, and allows the air to pass among it more freely. Whatever ground falls vacant in autumn, ought always to be dug up in ridges, unless it be very light and shallow, that it may derive all the benefit of the winter frost and snow. The difference in the ease of working in the spring, soil that has been thus exposed, and such as has been left untouched, is most marked and striking. Hoeing, at least among growing vegetables, should be deep, and stir the ground well, this being quite as important as killing the weeds. Raking is always bad, unless where wholly unavoidable, for it tends to encrust over the surface of the ground, and render it hard and close.

3.—*Watering.*

This ought to be done with the spout of a can for individual plants, or with a rose for a mass of them. The watering-pot must be held as low as possible during the operation, that the particles of the earth may not be washed into a crust. When watering with a rose, too, it will be necessary to stir the surface of the ground occasionally, or it will become baked, and impervious to both air and moisture. Watering or syringing over the head of plants is an important part of the process.

After watering has once been begun with any out-door plants, it will be proper to continue it regularly until rain occurs ; otherwise the plants will suffer almost more than if they had been left entirely to themselves. If there is no danger from frost, the evening is the best period for watering plants, as it allows them the whole night for the purpose of imbibing and profiting by it. The early morning is the safer time at other seasons. Plants in pots will

require to be watered with great constancy, but discrimination ; giving to each only just what it is seen to need. They should be watered solely in mild weather during winter, as wetness conduces to injury by frost.

4.—*Propagating by Seeds.*

The most common way of procuring a great number of plants of one kind, is by sowing seed ; indeed, this is the means which nature herself has provided, and, of course, it is the most simple and efficacious.

Every seed has a shell more or less hard, to protect it from external injury, and at its base is furnished with what is called the seed-pore, (popularly the *eye*,) which performs two important functions, viz., conveys the nutrient pulp to the seed while in a young and green state, and previous to its becoming ripe, and also is the point from which the roots and stem of the young plant proceed after sowing.

Within the shell is the kernel, consisting of the embryo plant, with its radicle or root, its gemlet or stem, and the neck between these, which afterwards becomes the crown, besides the seed lobe or lobes containing materials for nourishing it in the first stage of growth.

In order to excite the embryo into action, and induce it to grow, four things are indispensable—heat, water, air, and darkness.

The heat is required to soften the nutrient materials in the lobes, but without water it would be more likely to harden these. Pure water is more appropriate than water containing humin or other rich materials, that which is contained in the lobes being sufficiently rich.

Freely circulating air is indispensable for supplying oxygen gas, and carrying off carbomic acid gas, a process the reverse of what takes place in leaves exposed to sunlight. For the same reason light is injurious, by carrying off the oxygen gas requisite in this stage of growth.

In sowing any sort of seed, these four circumstances must be carefully attended to. On account of the absence of heat, accordingly, seeds will not vegetate during

frost ; without a sufficient supply of water, they will not come up when sown in dry sand ; for want of air they will not come up if too deep in the ground ; and if not duly covered, they will not come up from having too much light.

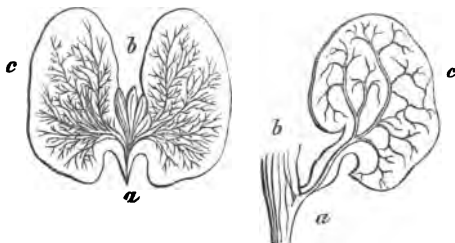
Seeds, however, often germinate in the light, such as corn in wet seasons, before it is cut ; but they do not, in these cases, produce strong plants, as the root requires to shoot away from the light, as much as the stem into the light. Birch seed succeeds best when not covered. These are exceptions, not rules.

Most seeds are benefited by steeping them for an hour or two, previous to sowing, in pure water, which, in the cold weather of spring, may be made milk-warm. Pickles, train-oil, urine, and other steeps, must, in most cases, be injurious ; and will never, as is ignorantly pretended, destroy the eggs of insects, even if such be among the seed, of which we know not a single instance, not even the eggs of the turnip fly, as lately asserted.

Too much water, however, will be certain to injure the seeds, by gorging them, and rendering them dropsical and liable to rot. But, on the other hand, many seeds will vegetate in water alone, provided the vessel in which they are placed be open at the top for the admission of air ; so that a good supply of water is absolutely essential for furthering this process. It is important, however, to avoid both extreme drought and moisture, in the propagation of plants by seed, either of which is more or less injurious. Hence the propriety of sowing seeds when the weather is only moderately wet, and the ground not saturated with moisture, in order that the seeds may obtain a due supply, but not a redundancy of water.

The seed lobes, after having parted with some of their nutrient matter, for the production of the roots, protrude themselves from the soil, expand, and are changed into seed leaves. They then perform functions of a totally different nature, and proceed to prepare pulp from the sap now taken up by the young root, for the support and development of the stem and leaves. When these latter have become sufficiently expanded to be capable of providing pulp for themselves, and the other parts of the plant,

the seed leaves, having fulfilled the office assigned to them, by nature, soon wither and decay.



Seed lobes in the bean, with the nutrient vessels branching through them magnified. *a*, *a*, root; *b*, *b*, gemlet; *c*, *c*, seed lobes.

The seed leaves are, therefore, of such vital importance to plants, at an early stage of their existence, that if they are destroyed at this period of their growth, either by insects, such as the turnip fly, snails, slugs, or grubs, or by birds, frost, or other casualties, they seldom recover, and the whole crop generally perishes. This is not unfrequently the case with young turnips, radishes, and cabbages; and the only alternative, where it is permitted to occur, is to dig the ground slightly over, and sow it afresh. The greatest care, however, should be exercised to prevent such an accident, as it will frequently throw the crop too late to be of any real use.

Propagation by seeds, then being the most natural and easy means of multiplying plants, should ordinarily be preferred. But some plants, as the foreign geraniums, and most double flowers, do not ripen seed; in others, as the rose, the seeds are generally two years in the ground before they vegetate, and do not produce flowers for several years after; and in other cases, each seed will produce a plant essentially different from the parent species. This latter circumstance has been taken advantage of by gardeners and florists, and hence are produced the almost innumerable beautiful varieties of the dahlia, chrysanthemum,

heart's-ease, tulip, ranunculus, and many others too numerous to mention. In culinary vegetables, also, most of our best sorts of cabbage, lettuce, and other similar kinds, have been produced from seed. These are only to be obtained, however, by what is termed "cross-fertilisation," or hybridising, which is simply transferring the pollen, or small yellow or red dust, from the anthers of a flower of one sort, to the summit of the pistil or female part of the flower of another sort, and thus producing seed, the plants from which will partake of the nature of both the parent species.

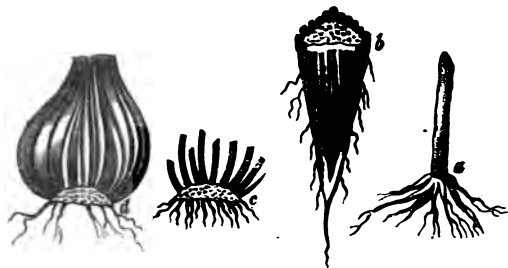
A continuation of such circumstances as those before-mentioned, has led to the application of art in the propagation of plants, and several methods have successively been devised, for multiplying particular kinds, in a different manner than by sowing seed. Indeed, to such an extent have the various systems been carried, that propagation by seed has now been almost entirely superseded, except with such kinds as are only of annual or biennial duration, or are of herbaceous habits. In the following arrangement, it will be seen that the different methods have been treated of in the order in which they were naturally suggested.

5.—*Propagating by division of the Roots.*

Every root has what is called the crown or neck, and in some tuberous roots, as the potato, a similar part is called the *eye*, attached to which is the body of the root, and from this the fibres with their feeding tips or mouths are produced.

The crown, neck, or eye, is in most roots the only part of them that can send up a stem. The exceptions to this, are the roots of mint, horse-radish, iris, Jerusalem artichoke, couch or quitch grass, and a troublesome weed in gardens called ash-weed, from the leaf resembling that of the ash, the smallest piece of the roots of any of which will grow, because they seem to be rather under-ground stems than real roots. Rhubarb, likewise, and sea-kale will generally produce plants from a piece of the roots, though entirely destitute of eyes. They are, however, a great length of time in performing this process, and the

practice of propagating them in this manner cannot be recommended for gardening purposes. Dandelions, sow-thistles, and the like, might also be adduced as further illustrations of this principle, and teach us the fallacy of attempting to destroy them by merely hoeing off their tops, as the only method of getting rid of them is to eradicate every particle of the roots.



Roots to show the neck or crown ; *a*, in shrubs and trees ; *b*, on the carrot ; *c*, on herbs ; *d*, on bulbs.

It will follow, that with these, and a few other similar exceptions, roots will only be capable of being divided when they have more crowns or eyes than one, as in the small bulbs that grow at the base of the larger bulbs in lilies, daffodils, tulips, and snow-drops ; the eyes in potatoes, and rhubarb ; the crowns in primroses, auriculas, sea-pinks or thrift, dahlias, pæonies, and double rockets ; and the side branches in border box and carnations.

In many of the plants just mentioned, such, for instance, as bulbs and primroses, the different crowns may be easily separated from each other by the hand, as they may generally be broken off, or pulled asunder, with a good portion of roots attached to each division, and being thus well provided with roots, will grow without the slightest difficulty. These remarks are also applicable to dwarf-box, which only requires to be slipped or broken off, with a few roots to each division, to render success certain, as it will seldom grow without each piece is allowed to retain a few roots.

But there are others, such as dahlias, pæonies, and rhubarb, which cannot be properly separated by the hand, and with these the crown or eye ought to be cut with a sharp knife, so as not to tear or bruise the parts; and each division should, if possible, have a piece of the body of the root, and also some fibres, with their tips uninjured. This, however, is not indispensable, for the crown or eye alone will often grow without possessing any fibres at the time of planting, as is the case with auriculas; though the fibres will, in very few instances, succeed, without having some part of the body of the root, or of the crown, attached to them.

The chief points then to be attended to in the propagation of plants, by dividing the roots, is to see that each division has, at least, a few roots, and either a bud or eye, or the rudiment of one.

This mode of multiplying and increasing plants, it will be seen, is almost as natural as propagation by seed, except that, by the latter, plants diffuse their own seed, and increase their own species; while, by the one now under consideration, the assistance of man is necessary to perform the operation for them. It is now, however, very seldom practised, except with a few common sorts, and herbs, as by the methods yet remaining to be detailed, a much greater number of young plants may be obtained.

6.—*Propagating by Offsets, Layers, and Suckers.*

Many plants, instead of having a number of crowns or eyes, have only one, and send off short stems like the daisy and houseleek, or large runners like the sweet violet, the ground ivy, and the strawberry, with young plants at the end, which readily take root, and may either be allowed to do so after cutting the runner, or before the separation, if it is required to make them rather stronger.

The time for doing this must be in some measure regulated by the growth of the offsets, and by the season of the year; for it is important that all such plants should be well rooted and established in the soil, before the usual period for the commencement of autumnal frosts.

When the offsets are not naturally capable of forming roots of themselves, as in the carnation, an operation called

layering is performed, which consists of interrupting the passage of the pulp downwards, by making an upward slit with a penknife half through the stem, and by several other methods ; then, fixing the cut part a little under ground with a hooked peg, root fibres will form, and the rooted layer may, of course, be removed, and planted elsewhere.

The operation of layering being an important one, and capable of being performed on a great number of plants, it is highly necessary that it should be properly understood. Much depends on the manner in which the slit or incision is made ; for, in layering carnations, if, by any means, the knife be suffered to pass more than half way through the stem, it will be exceedingly liable to be broken, or even to rot off ; therefore, the knife (which must be a very sharp one) should be guided with great care, and the incision commenced about a quarter of an inch below the joint to be layered, passing the blade of the knife precisely through the centre of the stem, to about half an inch above the joint ; then cut off, neatly and smoothly, the tip or end of



The operation of layering shown in the Carnation.

the tongue thus formed, as, if this is left jagged or rough, it will absorb too much moisture, and be very liable to rot, thus preventing the layer from rooting. The layer should

in no case be placed deeper than an inch in the soil, and a little fine and rich mould should be introduced to cover it, which will prevent it from becoming too wet. Unless the slit in the stem is made to pass through the middle of a joint, it will never succeed in forming roots.

The lower part of the stems intended to be layered, should be deprived of their leaves ; these must not be plucked off, but cut with a sharp knife, to within a short distance of the stem, and none of the leaves should be left that would be buried in the soil when the shoot is fastened down. Carnations should be layered as soon as the flowering season is nearly over, and none of the stems which had produced flowers should be employed for this purpose.

Many other plants, such as double wallflowers, lilacs, honeysuckles, roses, sweetbriar, laurels, and most shrubs and evergreens, may be propagated by layers, it being a very certain, as well as an easy mode of getting a number of plants. In layering roses, however, and other plants of shrubby habits, a different method must be adopted to that of layering carnations, for with carnations, the stems being exceedingly brittle, it is necessary to *tongue* them, in order to check the flow of the pulp ; but with shrubby plants, such as roses and laurels, all that is required is to run a penknife through the shoot to be layered, at a bud or joint, and having slightly twisted the shoot, so as to open or crack the bark round the part so cut, bury it to about three inches below the surface of the soil, securing it with a hooked peg, and treading the soil slightly round it, so as to place it almost erect. In this state it will soon form roots at the joint in which the incision was made, and may then be separated from the parent plant, and planted where required.

From the roots of some trees which lie near the surface of the soil, a quantity of young shoots are produced called *suckers*. These are generally very unsightly, and deprive the tree of much of that nourishment which should be devoted to the support of the flowers and fruit. They should, therefore, never be allowed to remain in such situations, even though they were destroyed ; but they are all capable of forming a fresh plant, if taken up with care. They are generally most abundant about the roots of

gooseberries, currants, plums, lilacs, and roses, but are found occasionally with most shrubby plants or trees. The suckers of gooseberries, currants, and fruit trees, should always be eradicated and thrown away, as they will never produce good fruit; those of lilacs, and other flowering shrubs and trees, may be removed in the autumn, and planted in any required situation, provided care is taken to lift them with sufficient roots, and, if possible, with root fibres and their tips attached to them; but, even these are inferior to the plants produced from layers, as they will not come into flower for a great length of time, while layers usually bloom much sooner.

Roses, especially the common sorts, produce excellent suckers, which answer well for stocks, to bud the choicest sorts upon. The suckers from the better kind of roses, will flower best if converted into layers.

In the monthly rose, suckers make the best plants, as they do also in the sweetbriar; but this does not produce many. Such suckers, when long and easily bent, may also be treated as layers; and as many new plants may be obtained as there are buds on the sucker, by making a ring-cut through the bark below each bud, and laying over the whole sucker, when pegged down, a shallow covering of rather dry earth, when a stem will rise from each bud, and roots grow from each ring of bark that has been cut—a good mode of multiplying rose trees.

7.—Propagating by Slips or Cuttings.

The method of propagating plants by layers being troublesome and protracted, has led to the introduction of a much more simple and speedy process, and one by which a much greater number of plants may be obtained.

The younger twigs or branches of many plants and shrubs, and even the trunks of some trees, such as the willow and elder, if planted in the ground, and properly treated, will not only continue to live, and retain their vital principle almost as well as a layer attached to the parent plant, but will speedily produce roots from their lower extremities, and these will extend themselves into the soil, supply the stem with nourishment, to enable it to form

leaves and branches, and, in course of time, attain to the size and vigour of the parent plant. Every tree, shrub, or plant, that is capable of producing buds, may be readily multiplied in this manner ; for each bud contains in itself the rudiment of another plant, and only requires to be separated from the parent plant, and judiciously treated, to enable it to produce leaves, shoots, fruit, or seed, and roots whereby these several parts may be nourished and brought to perfection.

This is one of the most important discoveries and achievements of science, as by it almost every description of plants may be multiplied, that do not produce seeds, or are not capable of propagating and extending their species by seed.

We have above observed, that each bud is capable of producing a distinct plant, and this is sufficiently proved by the vine and potato, though, in these, the young buds are usually termed *eyes*. But where young shoots are abundant, or where they are slender and of a watery nature, it is important that each shoot intended for a cutting, should have three or more buds above the surface of the soil in which they are planted.

To ensure success in the performance of this operation, attention must be paid to the following general particulars. The cuttings should invariably be made of the young and newly formed wood, but it is important that the lower extremity of them should not be too young and soft, otherwise it will become gorged with moisture and rot ; neither should it be too old and hard, for, in this case, it would not imbibe sufficient moisture to keep it alive, much less to induce it to grow. Therefore, in selecting shoots of any plant for cuttings, care should be taken to cut them off just at the junction of the old and young wood, by which means either of the above extremes will be avoided. Again, shoots intended for cuttings should always be taken off just below a bud, as they will only form roots from the buds or eyes, and if a bud is not left at the base, the end of the cutting will be liable to rot ; the ends also should be cut as smoothly as possible, taking care not to bruise the bark, or leave it jagged.

Cuttings, like seeds, require a due degree of heat, moisture,

and shade, to enable them to form roots, and establish themselves in the soil. Heat is indispensable, in order to stimulate them into action, and induce them to grow ; therefore, the practice of placing cuttings in a border with a northern aspect, is extremely injudicious, for, though they may thus be shaded from sun-light, they will be deprived of a sufficient degree of heat, and any artificial shading would answer equally well. A certain quantity of moisture is likewise necessary for them, but an undue supply of it has a most injurious tendency, and will speedily cause them to rot ; consequently, where they are planted in the open ground, a spot with a very light soil should be chosen for this purpose, and when they are placed in pots, an abundance of white sand should be mingled with the soil, or, with very delicate plants, pure sand alone is preferable.

To facilitate the escape of water from the pots containing cuttings, a good drainage is of first importance ; and, for this purpose, an abundance of pieces of broken pots, old bricks, or coal ashes, should be placed in the bottom of the pot ; indeed, the pot should be, at least, half filled with materials of this description ; and with cuttings that are difficult to strike, a good practice is to let the lower end of the cutting rest on some such materials as those above-mentioned, which will effectually prevent it from rotting at the base, and cause it to produce roots more speedily.

As the life of the cuttings must be somewhat feeble till the roots are formed, and as an exposure to light would induce them to evaporate what little moisture they contain, and, consequently, cause them to wither and die, the more delicate and tender kinds, and those of a watery nature, with soft and juicy stems, should be covered with a bell-glass, and a piece of garden mat or canvas placed over this to shade them during the heat of the day ; and, where a hand-glass is not procurable, a few willow, or other branches, should be bent over them, in order to support the material used for shading ; but with hardy trees and shrubs this protection is unnecessary. For the same reasons, the cuttings should be deprived of most of their leaves, and any tendency to produce flower-buds must be carefully checked, as either too many leaves, or any flowers,

would exhaust the sap or pulp contained in the cutting, and very much weaken it, or wholly destroy it. Air is also of some importance in the process of propagation by cuttings, as without air they will become too weak and slender; therefore, where they are placed in the open ground, they should not be planted too deep, and with those which are kept under a hand-glass, the front of the glass should be slightly tilted with a brick or block of wood in fine weather, in order to admit a due quantity of air.

As most plants may be multiplied by cuttings, and as this operation may be performed by the inexperienced without difficulty, it appears desirable that a few brief directions should be given for increasing different descriptions of plants in this manner, and it will be convenient to arrange these under three divisions, viz., those which produce hard and woody stems, and are perfectly hardy, such as gooseberries, currants, and other hardy trees and shrubs; those which have more watery stems, and require some protection in winter, such as pelargoniums (improperly called geraniums) and dahlias; and such as are of a woody nature, and not hardy, as many heaths, myrtles, and others of similar habits.

To propagate gooseberries, currants, and other hardy shrubs, either flowering, or fruit-bearing, by cuttings, due attention must be paid to selecting the shoots, preparing them, and planting them out; either weak and slender, or strong and luxuriant shoots should be rejected, and those of medium size and strength chosen, for very large shoots would most probably die, and small weak ones would never produce good plants; therefore, in the autumn, (which is the proper time for performing this operation,) after the trees have shed their leaves, the shoots of the previous summer's growth, and of moderate size and strength, should be taken off for the purpose required. Where it is practicable, each shoot should be broken or slipped off with a small portion of the old stem attached to its base, as this will greatly facilitate the production of roots; for there are always a number of buds about the base of each shoot, and it is from buds alone that roots can be expected to form. This may be done with great propriety in the gooseberry, as gooseberry trees are even benefited by having their

superfluous shoots thus slipped out ; but currant trees, on the contrary, must not be so treated, for the buds which are destined to produce fruit, are generally found at the base of the young shoots. Those, therefore, which cannot be treated in this manner, should be cut off just below a bud, and the lower end of the cutting should be made perfectly smooth, while the upper end should be cut off in a sloping direction, close to another bud. The cuttings should be made about six inches in length, though three inches will be sufficient when the young shoots are scarce, and all the buds should be taken off except the two uppermost ones, and the one at the base. When they are thus prepared, they should immediately be planted out, which may be done by opening a trench about two or three inches in depth, and having made one side of it erect by chopping it with the spade, insert the cuttings into it, and replace the soil about them, pressing it lightly round each, and leaving only the two buds or eyes out of the ground. This is far preferable to the common practice of dibbling them in, which presses the soil too closely about their lower extremities, and frequently causes them to rot, by retaining too much moisture about them.

Dahlias, pelargoniums, and other similar plants, which are desired to be propagated by cuttings, must receive a very different kind of treatment, and require much greater attention. Being themselves of a very watery and juicy nature, it is obvious that they will not strike if they are left exposed to the alternations of wet and drought, so common in our changeable climate; therefore, to preserve them from such injuries, they should constantly be covered with a hand-glass, or kept in the window of a dwelling-house, while this process is being performed. The hand-glass, when used, will likewise have the effect of retaining a sufficient degree of heat, and preserving the atmosphere within it in a moist state, as well as afford means for shading the cuttings. They should be taken from the extremities of the shoots, and deprived of all their lower leaves, but not of their buds, and will be much more likely to succeed, if only the summits of each shoot are used for this purpose: as, unlike hard-wooded plants, they will not thrive so well if the tops of the shoots are cut off. The

reason of this is, that if the cuttings are wounded at both ends, they will lose a much greater portion of their sap or juice, and be much more likely to die. When they are taken off, (which should uniformly be just below a bud,) they may either be planted out in a light soil in a southern situation, and a hand-glass placed over them, or, what is much better, may be planted from six to ten in a pot, in shallow pots well drained, and placed under a hand-glass, in a warm situation. They will occasionally require sprinkling with water from a pot with a fine rose, and constant shading from the heat of the sun, as well as protection from cold nights, both of which latter purposes may be accomplished by placing a piece of garden mat over the hand-glass. In this situation, and with this treatment, they will speedily form roots and grow, when they may be repotted, or planted out, as desired. Where the cuttings are taken from the roots, (such as dahlias,) a small portion of the crown of the root should be taken off, attached to each cutting, which will cause them to form roots much more speedily.

There are a few plants which are cultivated for ornament, such as heaths, myrtles, and some others, which are exceedingly difficult to propagate, and demand even more attention than those last treated of. These may be multiplied precisely in the same manner as pelargoniums, except that they can be placed more numerous in the pots, and must be prepared and planted as soon as possible after they are taken off, and each pot should have a small bell-glass over it, instead of placing a number of pots under one large glass. Failure in the propagation of such plants as these, is solely attributable to the circumstance of water being allowed to stagnate about the roots; therefore, the cuttings should be planted in pure white or silver (not river) sand, and have an abundance of drainage. The inside of the glasses should also occasionally be wiped with a dry cloth, as the moisture from evaporation generally accumulates on the inside of the glass, and if it is allowed to drip on the cuttings, will seriously injure them. Great care is also necessary, with regard to shading them from the sun, as if this is once neglected, they will unavoidably perish. Some interest and amusement may be occasioned by

putting the cuttings of various plants in a bottle containing water, such as an Eau de Cologne bottle, and suspending this in the window of a room in spring. By changing the water occasionally, roots will soon be emitted, when their growth may be easily watched. They can be potted as soon as the roots get about an inch long. Myrtles may be readily multiplied in this way.

By attention to these few plain directions, any plant that is capable of being multiplied by cuttings, may be so propagated with facility and success ; and as there are few plants but will submit to this operation, it is hoped that the above remarks will be found sufficient to guide even the most inexperienced in the performance of this important and useful branch of gardening.

8.—*Propagating by grafting.*

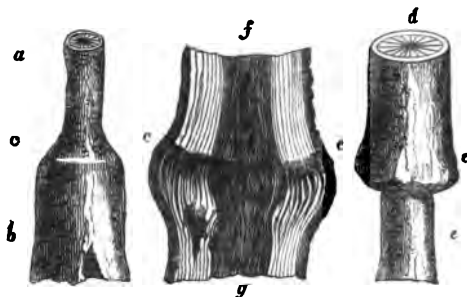
When particular sorts of shrubs and trees cannot be procured from seed, or when the seedlings would be a number of years in blowing or fruiting, slips of these sorts, or even buds, are cut off, and instead of planting them in the ground, they are fitted to a cut made in another suitable tree or shrub called the *stock*, by an operation variously performed, termed *grafting*, which can only be properly taught by a master, and not by a book.

The principle upon which the union takes place is, that the pulp from the cutting descends to its junction with the stock, where, being excluded from the air and light by a ball of prepared clay, it forms woody fibres instead of roots, as it might have done in the ground ; while, at the same time, the sap from the stock rises into the cutting, whose leaves convert it into pulp.

When the texture of the wood is softer in the cutting than in the stock, the latter interrupts the descent of the pulp, and forms a bulging scar ; when the cutting has a harder texture than the stock, the contrary takes place.

In the practice of grafting, only the sorts of the same or similar species succeed. A pear cutting, for instance, may be grafted on a quince or apple stock ; but not on a plum or cherry stock. The apple, however, succeeds when

grafted on the hawthorn or the mountain ash, though much better when grafted on a crab stock.



a, the *Pavia lutea*, a shrub, which never attains the size of a tree, cleft-grafted on the horse-chestnut; *b*, a tree of great size. It is remarkable that the *Pavia* is much enlarged near the junction *c*, like a tree near the ground, a circumstance which would not have occurred but for the graft. The bark of each remains distinct. *d*, the white-lime tree grafted on the European lime tree, *e*; each growing in diameter according to its particular nature, without any intermixture at the line of graft, *c*; a vertical section, *f*, *g*, of an almond-tree, *f*, cleft-grafted on a prunus, *g*, showing that not one of the characteristics of the two individuals ever passes the line of junction, *c*, *c*, any more than a spur grafted on the comb of the cock ever changes its hard horny nature for the soft fleshy nature of the comb.

When one branch of a growing tree or shrub is grafted to the branch of another growing plant near it, the process is termed *inarching*, but this system is seldom practised, except with rare and choice plants. When a bud from one tree is inserted into the bark of another tree, it is termed *budding*, and this is exceedingly advantageous with rose trees, for a fine standard rose may thus be obtained by simply inserting buds of good sorts on a stock of the wild rose or sweetbriar. It is also very useful in filling up the breaches in peach trees trained to a wall, which are sometimes occasioned by the decaying of a large branch.

9.—*Planting.*

It has previously been suggested that this operation should be performed in cloudy or showery weather. It must never be forgotten, in planting, that a plant is a *living* thing. For this reason it should not be kept out of the ground, or its roots allowed to dry, or these last be much crippled. The new earth should also be placed about the roots with great care and gentleness, and not pressed upon them too violently. October and November are the best months for planting trees and shrubs, because they are then comparatively at rest, and the weather is usually dull and quiet. Where little check is required to be given, balls of earth to the roots must be obtained, if possible, and these not crushed or pressed against too rudely in planting.

Some recommend the process of puddling, which consists in mixing up soil and water into a kind of thin paste, and dipping the roots of the plants in this; or, in the cases of larger things, planting them wholly in a hole thus prepared. As ordinarily pursued, however, the plants might as well be placed in mortar or cement; for, as soon as the mud dries, it becomes a hard cake, which neither water nor air can thoroughly penetrate, and which will partly or altogether prevent the roots from extending. If adopted at all, it should only be in some modified manner for such things as cabbages or broccoli.

10.—*Pruning.*

Pruning is for the purpose of preventing extra luxuriance, of throwing plants into a flowering or fruit-bearing state, or of preserving some kinds from degeneracy. Very strong and very weakly shoots alike require most pruning; for the one class will be too vigorous, and the other too feeble, to be productive. But the sickly shoots of plants should be pruned back much closer than the luxuriant ones; for the object is to produce entirely new ones in the former case, while only shorter branches are desired in the latter, and hard pruning would merely tend to develop such as were similarly strong.

It is lateral branches and spurs that mostly bear flowers and fruit in some plants, and pruning is intended to multiply these. Hybrid plants, and those of which the sorts have been greatly improved by culture, are such as chiefly require pruning. Stopping the *young* shoots of many kinds may sometimes be preferable, as it hinders the plants from wasting their strength unduly. Even removing the buds that are not required to develop just after they have burst, may often be advantageously practised. Indeed, summer pruning is of more consequence than is generally believed for plants that will not bleed much, especially if they have to be trained, or if any particular kind of new growth is wanted. Late in the autumn, or early in the winter or spring, are, however, the principal times for pruning. It may be extended to the roots in certain cases, where extreme woodiness is wanted to be restrained.

11.—*Flowering and Fruiting.*

Both of these states are generally to be brought about, where they do not naturally occur with sufficient readiness or force, by a series of checks. Whatever promotes strong and rank growth is decidedly against them. The perfect ripening of the wood, and, in fact, the complete maturity of all the parts, such as a sunny summer and an exposed situation will produce, are necessary to the full development of these tendencies. Transplanting, withholding manure or water, judicious pruning, exposure to sun and air, keeping the roots near the surface of the ground, slightly raising the plant above the general level, shallow soil, and thorough draining, are the best things to produce fertility, when it does not show itself at the usual period; and, with the exception of stinting the supply of manure and water, they will be beneficial at all times. Deep planting, or imperfect drainage, are exceedingly bad; and manure will ordinarily be adverse to flowers. For plants in pots that are prone to become too vigorous, cramping the roots, diminishing the supplies of water, and putting them a good deal in the open sunshine, will do much towards restoring them to the desired condition.

12.—*Sheltering and Protecting.*

Shelter from winds should be given by loose and meshy, not solid materials. Trees and shrubs are better for the purpose than walls, as they exhaust the force of the currents, while walls only divert it and increase its power. Hurdles filled in loosely with reeds or rough laths, or branches of pine or furze, are also preferable, in point of shelter, to closely boarded ones, for the same reason.

Shade from the sun's rays should, in like manner, be thin and partial only. A few fir branches stuck around the plant to be shaded, or some very thin canvas or gauze stretched over it, will generally suffice; the object being merely to break the extreme power of the sun's rays, and not to shut them out entirely. Anything dense or opaque is therefore objectionable. Mulching applied over the roots, to keep the soil very moist, will be a good substitute for shade in some cases. Plants rarely want shading, unless when they have been newly removed, or are in bloom.

Protection from frost may be secured by simply intercepting the radiating process. Whatever keeps plants moderately dry at the roots will greatly help to protect them; for frosts act far less upon them at that time than when they are in a wet state. A temporary pent-house, or small tent-like canopy, open at the sides, will occasionally be sufficient both to keep plants dry and to prevent radiation. But in very severe weather they may be covered up more closely, bearing in mind that the point always to attain is to stop radiation rather than to communicate additional heat.

When plants have, by the sudden occurrence of frost or any other accident, become slightly frozen, and their tissue is not actually destroyed, they may be saved by watering them with cold water just before sun-rise in the morning, and covering them over with a mat or other object which will keep them in the dark until they have gradually thawed. The design is to prevent the sun from shining upon them till they are quite restored.

13.—*Rotation of Crops.*

Such an arrangement as the change of crops becomes necessary because different plants exhaust the soil of particular elements, and are more or less gross and extravagant in their habits; so that where they have grown one year they will have so much withdrawn the kind of food they require, as to be incapable of attaining any perfection on the same plot in the following season. Other kinds, however, coming after them, may not need anything like so much of the same element, or may not even want it at all. The practice likewise causes a saving of manure, for when the food a crop requires has not been abstracted from the soil by a previous crop, manure will sometimes be superfluous. Potatoes, scarlet-runners, broccoli, and the cabbage tribe, particularly demand a fresh soil yearly. Pansies, hyacinths, and other bulbs and florists' flowers that are of hybrid origin, are similarly fastidious, if they are to be grown to great perfection.

By ridging up the ground in winter for vegetable crops, and thus admitting new gases from the air, and salts from snow and rain, the rotation plan of cropping becomes less necessary, though it may never be entirely dispensed with. Perhaps, when the precise food which every individual crop requires, and the manures fully capable of supplying such are more thoroughly known, and experimentally tested, the necessity for changing yearly the vegetable tenants of any particular piece of land that best suits a certain tribe, may be almost if not altogether annihilated.

IV.—THE ACCIDENTS OF CULTIVATION.

In giving practical effect to the principles of gardening, there will be a number of things requisite to be obtained, and a multitude of little cross agencies to avoid or to remove. These are here, for convenience, termed the "accidents" of cultivation; some of them being mere adjuncts to the art, and others of only casual occurrence. We shall only advert to two or three of the principal of them.

1.—*Tools and Conveniences.*

No one can garden well, or do as much work, or perform it as easily, with a bad tool. And though the proverb affirms that "a bad workman is sure to find fault with his tools," it is equally true that a good workman will rarely be found using an inferior implement. It is most essential to comfort and progress in gardening that tools should be well and neatly made, and never be too large or clumsy. A handy tool, it has often been said, will almost work itself. Country smiths are very seldom capable of either making or mending a good implement; on which account they should be procured from towns, or at least be of town manufacture.

Attention should be paid, in choosing tools, to the length and curves of the handles, and of the metal parts, that they may suit the height of the workman, and enable him to use them with the least possible exertion and stooping.

Forks and deep hoes, or small picks, are most important tools in a vegetable garden, for stirring the ground among the crops. For merely cleaning the ground, nothing is so good as the Dutch hoe, which skims off the weeds without much soil to them, and leaves them loosely on the surface without being half-buried or trodden. A draw hoe will never kill weeds half as readily or as effectually as a Dutch hoe. But where the ground is very strong, or the weeds have acquired considerable power, (a circumstance which never ought to exist,) the draw hoe will do the work with greater facility.

A proper tool-shed, where each article used in the garden can have a distinct place, and be put away clean and neat, is one of the greatest conveniences in a garden, and can be used also for storing onions in, and carrots, and even potatoes if there be room. One corner of it can be devoted to a barrow, and another to a small ladder. In the summer, this shed will be a fit place for drying and cleaning seeds, while it will afford space for drying a few herbs during autumn. Refuse wood, preparing for household use, may further be brought by parcels into this shed, and stowed there to acquire additional dryness. In these and various

other ways, a small shed may have its space so husbanded as to become the means of supplying many a comfort, and relieving the house of many a burden or nuisance.

2.—*Diseases of Plants.*

The great cause of disease in plants is bad cultivation; and its remedy, of course, an improved system of treatment. A plant that is growing in a soil imperfectly drained, or which has not room properly to develop itself, or nutriment sufficient to keep it vigorous, is sure to be unhealthy; and a sickly or weak state is always next door to disease. An unhealthy plant may, indeed, become diseased at any moment; for disease is but a development or localisation of general unhealthiness.

Still, disease will occasionally manifest itself under the most careful and judicious culture; and the more artificially a plant is treated, the more will it be liable to the attacks of disease. A condition the nearest that is possible to nature is the soundest and healthiest both in plants and animals; and every departure from that state is more or less fraught with danger.

Barrenness, if it may be called a disease, has already had its cure pointed out. Canker in trees, especially fruit-trees, will sometimes happen without any apparent cause. The best remedy will be carefully to cut out the dead or affected parts, and administer a thin plaster, composed of clay, cow-dung, and soot. This will generally heal the wound, and cause new bark to grow gradually over it. Mouldiness or gangrene in stems and leaves is apt to affect plants growing in pots that have insufficient air or too much moisture, particularly if they be at all succulent or tender. It should be guarded against as much as possible, by due ventilation and dryness; but, when it appears, the parts affected should be at once removed with a knife, or, if the gangrene has not proceeded far into the stems, perhaps the use of a little quick-lime will suspend its progress, and at length restore the part to soundness.

Water stagnant in soils, from accidental causes, may put plants into such a bad condition, that they will lose nearly all their root-fibres, and have nothing left but the mere

trunks of the roots. When the occasion of the evil is not discovered till it has reached to this serious extent, and the plants are too valuable or too great favourites to be thrown away, they might probably be restored by taking them out of the earth, washing their roots quite clean, paring away all their diseased or decaying parts, and planting or potting them afresh under more congenial auspices. With subsequent attention, they may thus be made to surmount the disease.

In stiff clayey soils, cherry-trees will sometimes take to exuding a great deal of gum from their stems, and shortly afterwards exhibit all the symptoms of decay. There appears no remedy for this but planting them in much lighter and better drained ground. The attack seems produced by a kind of repletion, or extravagant luxuriance.

A singular blight has recently affected peas in much the same manner as the potatoes, but chiefly in the pods. It is as unaccountable as the potato disease, but occurs almost wholly in the later crops, which, it may be observed, are seldom free from some kind of disease, and are never very wholesome. They are most commonly attacked with mildew, which renders them an uncertain and unproductive crop.

Many other kinds of diseases are incident to plants; but some of their reputed affections are the work of insects, rather than organic disease. They who are careful to cultivate them well have little to apprehend in the way of ordinary natural visitations.

3.—*Injurious Insects and Animals.*

What has been just remarked about disease arising out of imperfect culture may be extended in great part to the attacks of insects, by which some gardens are so much devastated. It is a curious fact that many smaller insects do not commence their ravages on healthy plants, but seize upon them the moment they become diseased. Indeed, the appearance of the disease and the insects are sometimes so nearly coincident, that it is almost difficult to decide which comes first. One thing is certain, however, and pregnant with instruction, which is, that healthy

plants that are altogether in good condition, and are well cared for, do not attract insects, any more than disease, nearly so much as those which are feeble and badly tended.

Neglected and slovenly gardens likewise, as it is well known, afford a convenient harbourage for many kinds of insects and vermin. Rubbish lying about in little heaps, decaying vegetable matter, little gatherings of divers loose substances in the corners and about the bottoms of palings or hedges, accumulations of weeds, and any species of untidiness, all give a resting, and lurking, and breeding-place for slugs, snails, numerous insects, mice, &c., which speedily overrun a garden, and destroy the greater part of its produce. Cleanliness and order are, therefore, the best preventives of insect gatherings.

Still, the greatest precaution and care are not always effectual in excluding such depredators; and they will, therefore, have to be dealt with as enemies, and destroyed as soon as they appear. It is of the greatest consequence that they be taken in time, and that a garden should be strictly "preserved," in the sense of excluding almost every kind of animal life, rather than of cherishing it. Most insects and vermin multiply with such amazing rapidity, that, if they be not early checked, their ravages will be indefinitely prolonged, and well nigh infinitely extended.

The various species of aphis, or plant-fly, which appear on so many plants, and suck out their best juices, must be got rid of by dashing water upon them from a syringe or engine, or by fumigating them with tobacco beneath a close calico covering, or by washing the parts with tobacco-water. They would soon devour all the leaves of such things as currant-trees, and render them very nearly useless. Water is the greatest enemy to the red-spider, which attacks fruit-trees on walls, but which may be driven away by vigorous syringing, when timely commenced. Wire-worms, grubs, &c., that live in the ground, and caterpillars, that feed on the leaves of plants, are chiefly to be extirpated by hand-picking; though the eggs of the latter may often be found glued to the branches of fruit-trees, and should be diligently looked after. Soot and lime in the soil will be a good safeguard against many insects that exist in the ground, as they will, if freely applied over the

surface, with slugs and snails. These last may also be trapped by laying about any fresh leaves in the garden, and examining them every night and morning. Worms that burrow on lawns or paths, disfiguring and making them dirty, may be destroyed by the use of lime-water, poured through the rose of a watering-pot.

Ducks will sometimes do a good deal of good, if allowed the run of a garden, by picking up slugs and snails. Birds likewise devour a great number of insects; but sparrows, chaffinches, and tomtits do little but mischief. Fowls are exceedingly injurious in a garden, and should never be admitted; while cats ought to be kept out as much as possible. Mice are pretty easily trapped; but rats, when once they get possession of a place, can only be taken by poison, very artfully and carefully laid for them, after they have been frequently enticed by the food in which it is at length administered. Rabbits, which increase prodigiously, and are highly destructive, can either be kept out with a close fence, or snared by setting wire gins in their runs, or taken in the holes by ferrets, or shot. They will require, when they have once obtained a lodgment in a place, to have the most constant war waged against them.

As with most other things, the remedy for these ills will generally be found easier than the cure. Taking a female wasp in spring, just before she has brought forth her teeming brood of young ones, will prevent the inroads of hundreds of wasps subsequently. Destroying a nest of young rabbits, which is easy, will be as good as catching an equal number of old ones, which is extremely difficult. Searching out for the eggs deposited by different insects, and crushing them, will keep away myriads of these annoying pests. And a complete visitation of rats may be warded off by daubing with gas tar the holes through which the first pioneer of the troop enters, and otherwise rendering his quarters displeasing and intolerable.

C. THE ART AND PRACTICE OF GARDENING.

Gardening, as an art, ought to be practised so as to accord with the principles of science, in supplying plants with proper food, and affording them due exposure to light and air, and sufficient shelter from cold and other external injuries.

In carrying into effect any of the principles of science, some consideration is necessary, with regard to the peculiar structure and habits of the different plants, before submitting them to any particular kind of treatment ; and as the deepest acquaintance with science would fail in this particular, it is obvious that science alone can never teach an individual what particular management is necessary for certain crops ; therefore, to convey a more correct and accurate notion of this important part of the subject, the succeeding pages will be devoted to practical directions for cultivating and managing the various kinds of culinary vegetables, fruits, and flowers.

I.—ON REARING KITCHEN VEGETABLES.

As the food of plants can be reduced to a few simple principles ; in the same way the food of man, so far as it is derived from the produce of the garden, is composed chiefly of the various combinations of carbon, and the three gases, oxygen, hydrogen, and nitrogen ; in the forms chiefly of starch, gluten, sugar, and fibre.

The most nutritive of these is starch, or rather the basis of starch, discovered by M. Biot, and termed *Dextrine* ; and the least nutritive is fibre. A good proportion of that, however, which is less nutritive is useful ; for food is far from being most wholesome when too refined, otherwise an exclusive diet of dextrine, or of essence of beef, would be the best ; but experience proves the contrary.

As we proceed, we shall mention the proportions of starch, sugar, and fibre, in the common garden vegetables used for food, so that some estimate may be formed of

their nutritive qualities ; and treat very briefly, or wholly pass over, such as are not profitable to rear in a small garden of from one-sixth to one-fourth, or half an acre in extent.

It may be convenient to arrange kitchen vegetables into four divisions, according to the particular parts of each which are eaten by man, as roots, stems, leaves, and seeds.

I.—ROOTS.

The roots chiefly cultivated in gardens are, potatoes, carrots, parsneps, beet, Jerusalem artichokes, turnips, and radishes.

1.—*Potatoes.*

Waxy Potatoes contain but little nutriment ; when mealy, one thousand parts contain two hundred parts of starch, (used for the finest flour by French biscuit bakers, and sold as arrow-root by the druggists,) forty parts of gluten, twenty parts of sugar, and the rest fibre. Even for cattle they are not very nutritive in a raw state, because the envelope around the small particles of their dextrine, requires to be burst by heat to make it available. The berries or apples are poisonous, and contain atropine.

"Potatoes given to horses," says Mr. Menteth, "as well as to all other animals, ought to be previously either boiled or steamed ; for horses, on eating raw potatoes, are liable to be seized with colic, which generally proves fatal." An acre of potatoes will supply about double the quantity of an acre of wheat.

The best soil for potatoes is rich sandy loam ; for on stiff, heavy, clayey, or wet land, they do not thrive well. On sandy soil the best manure is stable or cow dung, which has been well rotted ; and on heavy or wet land, coal ashes, (sparingly,) or a previous liming. In peat soils, without liming, they are frequently hollow-hearted, and this sort of soil is by no means so good as a loamy one. From the last week in April, to the middle of May, is the time for planting for the general crop, but if a piece of ground is planted about the latter end of March, a very

good crop may be obtained, without being liable to injuries from frost, which is almost unavoidable in those which are planted still earlier.

Since the occurrence of the potato disease, it has been found best to use chiefly such sorts as ripen early, and to plant them towards the middle or end of February, or the first week in March where the ground is of a wet nature. Manure of all kinds has been thought to develop the disease, unless very sparingly applied, and land that is the lightest or most sandy appears to produce the soundest crops. Guano, applied in showery weather, just as the shoots are breaking through the ground, has proved a good manure, if not too copiously administered. When early planting causes the shoots to appear above ground before the spring frosts have ceased, they should be freely earthed up as soon as their growth is observed, as this will often be the means of saving them.

The sorts of potatoes are numerous, and many of them peculiar to certain districts, as the minions in Ireland, and champions around London. The kidneys, or long white, and the Scotch red or purple, are excellent for new ground. Most counties have, however, a number of sorts peculiar to themselves; and these are generally preferable to such as are obtained from other parts. The best can be easily known by inquiry of any good gardener or farmer; and earliness of ripening will certainly now be a recommendation.

As a distinct stem will be formed from every eye or bud, and as planting a potato uncut would therefore produce more stems crowded together than could find room to grow, as well as very much weaken the new tubers, by depriving them of the nourishment they ought to receive, and exposing a greater surface of leaves to the action of the atmosphere, which would necessarily induce an increased evaporation; it seems preferable, two or three days before planting, to cut the sets, so as to leave not more than two or three eyes to each, with a piece of the potato thick enough to nourish the stem till it arrives above the surface of the ground.

When uncut potatoes are used, as some prefer, all the eyes but two or three ought to be scooped out, and they

must be planted at greater distances, to give room for the plants to get light and air, otherwise they may as well be planted under trees or hedges. The eyes or buds nearest the root-fibre sprout a week or more later than those farthest from it, on the same principle that the top shoots of a tree come first into leaf ; and, therefore, in planting uncut sets, the produce will be unequal in size, and ripen at different times, if the greater part of the eyes are not extracted. In planting cut sets, the two sorts of eyes should be planted in separate rows, as is always done in Lancashire. Potatoes for planting are found to answer best when procured from a different soil, as they seem to like a change of food ; though this is most probably owing to the new soil in which they are placed being well furnished with those elements which they had so largely withdrawn from their former situation ; for it is now well known that few plants, and especially potatoes, will attain to any perfection, or produce good crops, if planted in the same soil for two or three successive years.

Drills are preferable to the Irish lazy-beds, or to dibbling. The drills ought to be two, or even three feet apart, the manure spread at the bottom, the cut sets dropt over, or as some prefer, under the manure at from eight inches to a foot distant, the uncut sets at two feet distant, and the whole covered with three or four inches' depth of earth. An application of a mixture of bone-dust and lime will also be highly beneficial, and should be scattered sparingly along the drills, before covering the plants with soil.

Around London, it is the most usual practice to dibble potatoes with a large two-handled dibber, having an iron guard to prevent it from going too deep ; but this is done chiefly for the sake of saving time, and is by no means so good a practice as that of ridging the ground intended for potatoes in the autumn, or early in the winter, and allowing it to remain in this state through the winter, till the time arrives for planting out, when the potatoes or sets may be dropt into the valleys between the ridges, the manure placed over them, and part of the earth from the ridges hoed in upon them, leaving the remainder till they have started growing and require earthing up. This practice is

productive of great advantage, particularly in wet adhesive soils, as by being exposed to the action of the weather during the winter, the soil will become pulverised, and much better adapted for growing potatoes. With early planting, dibbling is also found to cause the water to lodge around and rot the sets in the holes thus formed, unless the soil be particularly dry.

When the plants are two or three inches above ground, the space between the roots ought to be well dug to loosen the soil, and encourage the spreading of the roots. When half a foot high, the earth should be hoed up to the stem, so as to cover the potatoes at the surface from the light, which turns them green and acrid, and to permit the air to penetrate to the farthest spread roots. Another hoeing will be afterwards wanted to keep the stems from falling down.

In light soil, when potatoes have been dibbled in, edge hoeing and flat hoeing without much earthing up answers best. Care must be taken not to choke the plants by drawing the earth too close; and all weeds, which rob the crop of food, and shade it from light, must be grubbed up.

All the blossom ought to be picked off by hand, for both the blossom, and the berry that follows it, exhaust, as it appears, the pulp prepared by the leaves, which may thus be directed to increase the produce of the roots.

The withering of the plant shows the proper time for digging up the crop. If any are dug up before this, they ought not to be exposed to the sun, which will deprive them of oxygen, render them acrid, and injure their flavour. The haum or straws should be rotted for manure.

Early potatoes, that is, those which come into use before the end of June, or the beginning of July, are an unprofitable luxury, containing very little starch and some sugar, but scarcely any nourishment. One method of inducing them to come early, is to save only half-ripe sets for planting, keeping them in dry sand, or chaff, during the winter, and taking care not to break the shoots when they are planted. If spread out on a loft or floor, with an inch or two of sand or chaff over them, and plenty of air admitted when it does not freeze, the shoots will grow thicker, and even come into leaf before planting out in

March, or early in April ; at the time of planting, the ground should be left rough and cloddy to protect the crop from cold winds. In case of a frosty night occurring afterwards, the hoar frost must be carefully thawed off by watering the plants over the tops from the rose of a watering-pot, before (not after) sun-rise.

The curl, a disease that puckers the leaves, is often injurious to potatoes, but no remedy is known. It is said to be caused by a grub in the root ; and, in this case, the application of a small quantity of lime at the time of planting, will certainly assist in preventing it, besides which it will have a tendency to preserve the sets from rotting. That more extensive and more mysterious visitation which has lately been experienced has hitherto yielded to none of the appliances of art. But as it seldom shows itself much before August or September, it is most important to get the tubers well formed, and at least partially matured before that time. Fresh land, that is of a light nature, and thoroughly well drained, and not shaded by trees, or much manured, is undoubtedly the safest. Some prefer pulling up the stems directly the disease begins to show itself ; but this does not appear of much value.

Potatoes should always be planted in moderately dry weather, if possible ; as, when the season at which they are planted happens to be wet, they almost invariably rot, and this is one great cause of failure.

Sets cut with a single eye, mature their crop a fortnight sooner than those cut with two or more eyes, though the latter is by far the safest practice, as the eyes sometimes prove abortive, and where there is more than one they are not so liable to rot. It is better to cut the sets a few days previous to planting, as the wounds will then become healed before they are brought in contact with the damp soil, and this also will tend to prevent them from rotting ; a circumstance so lamentably destructive of potato crops. After being taken from the ground, potatoes should be spread out in a dry shed for a few weeks, in order to get properly dried ; and be frequently turned over, to pick out the diseased tubers ; care being taken to prevent them from drying too much or shrivelling. They

keep better when moderately dry, and relieved of their diseased neighbours. The best place for storing them in is a dry shed or loft, that is not at all warm, and where they can be laid in dry sand, and covered with straw, to keep out frost. Putting them in pits, in the open ground, is at best but a necessary evil.

2.—*Carrots.*

The Carrot is a common wild plant, with a small woody root, improved by cultivation to a large sized fleshy root, containing in 140 parts, 95 parts of sugar, three parts of starch, and the rest water and fibre. It is, therefore, nourishing, wholesome, and profitable.

It grows naturally in a dry, gravelly, or sandy soil, but requires in the garden a deep rich sandy loam, well dug, but not fresh manured, which latter causes the roots to fork, unless the manure be buried more than half a foot. The time for sowing is from the end of February for the early crop, till the first week in April (not later) for the full crop.

For the early crop, the early horn sort is preferable, but is small and not so profitable as the orange or the Altringham : for the full crop, the red or long orange is best.

As the hairs on the seed cause it to mat together, rub it well with an equal quantity of dry sand and ashes, and on a calm day sow thinly broadcast, or rather strew it in drills an inch or less deep, and a foot or more apart, the ground being first rolled, or trodden firm and even ; cover lightly, and pat it over with the back of the spade. If it is sown broadcast, the ground should neither be trodden nor rolled previous to sowing, but the seed should be scattered over it immediately after digging, and it may then be well trodden, and the seed carefully raked in.

The seed ought not to be more than one year old, and is often bad. For forty feet of drill, a quarter of an ounce is enough, and the same for a bed three feet wide and eleven feet long.

Weeding is of the utmost importance, to give the plants all possible light and air ; and for the same reason, the plants themselves ought to be thinned out when in their

third leaf, to four, and afterwards to six, eight, or ten, inches apart.

When weeds are left to grow, or the thinnings are not attended to, the carrots will be small and spindly. In drilled crops, the ground must not be dug between, or it will cause forking. In the month of October the whole of the crop should be taken from the ground, deprived of their tops, though not too closely, and placed in a pit for the winter, covering them first with straw, and afterwards with two or three inches of soil ; the straw is intended to keep them from being injured by excessive moisture, and the soil to preserve them from the attacks of frost. Where, however, a place in the cellar can be devoted for this purpose, they should be piled in heaps, with a small quantity of river or drift sand placed between each layer, and in this manner they may be preserved sound and healthy, without losing any of their flavour, or drying up any of the nutritive juices they contain. If allowed to become too moist and warm, they begin to grow freely, and at once consume the greater part of their sugar ; thus rendering them flavourless. When permitted to get dry and flabby before being housed, they never recover their plumpness, and have a stale, disagreeable taste after boiling. One plant of each sort in the bed may be left to go to seed, or may be planted out for this purpose the following spring.

Very large carrots may be grown by making deep and large dibble holes, hard rammed at the sides, filling them loosely with rich earth, sowing a few seeds of the long sorts on the top, and when they come up, removing all but the plant nearest the centre.

Carrots are generally grown to an immense size when planted in river or sea sand ; therefore, it is important that the soil in which they are sown should be of a very light and sandy nature, and rendered fine by frequent digging. Indeed, this is the only point in the cultivation of carrots that demands particular attention, for if the soil is at all adhesive, or not well broken, the descent of the roots will be obstructed, and consequently they will become branched or forked, and when this is the case, they are generally worthless. So that, the lighter the soil in which carrots are grown, the finer will be the carrots produced. In wet

soil they are apt to split and become cankered, or be eaten by insects. Rabbits are particularly destructive to carrots, and they cannot, therefore, be safely grown where these animals abound, and there are no means of keeping them out of the garden.

When more carrots are grown than are wanted for the kitchen, they are excellent food for pigs and cattle, and also for poultry, when rasped and mixed, or boiled and mashed, with bran or oats,—a thing worth knowing, though little known.

3.—*Parsneps.*

One thousand parts of Parsneps contain ninety parts of sugar, nine parts of starch, and the rest water and fibre; they are therefore nourishing and wholesome, though somewhat coarse and hard of digestion by weaker stomachs.

Parsneps grow naturally in a chalky or marly soil, and thrive tolerably well in the garden on strong clay where neither carrots nor turnips attain to any perfection. A good rich loam, however, is far preferable to clay, which latter is totally unfit for most garden crops. They should not be sown (the seed not older than one year) later than March; and, if in drills, from four to six inches farther apart than the carrot, as they require more room.

For a bed four feet wide and twelve feet long, a quarter of an ounce of seed is sufficient.

In all other respects they may be cultivated precisely in the same manner as carrots. In thinning, they should at first be left in pairs, and, when six inches high, the weakest of each pair must be taken up. The hollow crowned and the Guernsey sorts are the best. Parsneps endure the hardest frost, which even improves them; therefore, they need not be taken up, except a few for use when the ground is frozen very hard. They are a very profitable crop, though not generally liked.

4.—*Beet.*

The root of the Beet contains a considerably greater proportion of sugar than the parsnep, but is similar in the other constituents.

The seed may be dibbled into holes an inch deep, and a foot apart, placing three or four seeds in each hole, and removing all the plants but one after they have formed their third leaf. In other respects the cultivation is so similar to that of the parsnep, that it is needless to repeat it. It flourishes best in a rich loamy soil, and requires to be sown about a fortnight later than the parsnep. As soon as the roots of the red or purple beet are matured, they should be taken up very carefully, and stored in pits similar to those recommended for carrots. In taking them from the ground, and divesting them of their leaves, care must be taken not to wound the root, which would bleed most profusely, and be much injured by it. The root of the white beet is not used, but the leaves are boiled like spinach, though they are not quite so good. The curled white is the best, and looks very pretty in the cottage gardens in Switzerland, in which it is universally grown.

5.—*Jerusalem* Artichoke.*

This is a sort of sun-flower, bearing on its roots a number of roundish tubers, like small potatoes, which are pulpy and sweet, containing much sugar, and therefore nourishing and wholesome.

All that is necessary to ensure a good crop, is to plant pieces of the tubers, or whole tubers, at any time through the winter or spring in a well-manured soil, in drills, from east to west, three feet apart, and two feet between the sets, covering them with three inches depth of earth.

In all other respects they may be treated like potatoes, except that they do not require so much hoeing; and as they are not injured by a moderate degree of frost, they need not, at least in the south, be taken up on that account. On account of their growing from seven to ten feet high, they must not be planted where they will shade other crops from light and air: but for strawberries, they are recommended as a summer shade by some gardeners, though, perhaps, rather injudiciously. They sometimes become a troublesome weed, as difficult to get rid of as horse-radish

* The name is not from the City of Jerusalem, but a corruption of the Italian *Girasole*, meaning "sun-flower."

or mint, and ought therefore to be kept at out corners of the garden. In some places, no care will make them succeed, and they cannot be strongly recommended for cottage gardens, though they are extremely prolific, and generally produce great crops.

Since the occurrence of the disease in potatoes, and their extreme scarcity and dearness in some seasons, the Jerusalem Artichoke has come more into use and favour. It forms a good summer screen or sort of hedge on the out-sides of gardens, especially along the northern, north-eastern, and north-western boundaries, where it will do no harm by its shade. In cooking, it should be squeezed dry after boiling, like Turnips.

6.—*Turnips.*

One thousand parts of Turnips contain seven parts of starch, thirty-four parts of sugar, one part of gluten, and the rest water, fibre, and nitrogen, on which their flavour chiefly depends: they are, consequently, nourishing and wholesome, though far inferior to potatoes.

They grow naturally as a weed in waste places and corn fields, but thrive best in the garden on light open soil, well manured some months before the sowing, and finely dug and raked. Ground that has been long cultivated and thickly cropped becomes unsuitable for turnips, being what gardeners term "cankery." They prefer an exposed, airy place, always thriving best in fields. Land that is at all sloping, especially towards the south, rarely suits them. The proper season for sowing is from the end of May till the middle of August successively; sooner than this the produce is usually small; though generally exceedingly sweet and pleasant.

For the first crops, the stone, Dutch, or any of the white varieties are best; for a late or winter crop, the Aberdeen yellow, the Swedish, or any of the yellow sorts, are preferable, at least as far as regards their being more hardy, though the white stone turnip has a far more agreeable flavour. The Teltow or long French for stewing, is sown first in April, and again in August.

Sow thickly broadcast, or rather in drills, a foot or a

foot and a half apart, covering with two inches or so of earth, which should be lightly beat or trodden down, and afterwards well raked in the same direction as the drills, and not in a contrary direction, which would disturb the seed and cause it to come up irregularly. For a bed four feet broad and twelve feet long, about a quarter of an ounce of seed is enough.

When the seed leaves get through the ground they are often devoured by a small jumping beetle, not much larger than a caraway seed, called the fly, flea, or black jack, though it is rather a shining bluish green than black, with two lighter streaks along the wing-cases; but there are several species similar. According to M. Bouché, the eggs are laid in July, and the dusky-brown grubs are hatched in the following May. They lie in the pupa state fifteen days, and the beetles appearing in July, die after they lay their eggs. Turnips, therefore, if M. Bouché is correct, when sown after the middle of August and out of their seed leaf before May, are safe from this, though not from other species. At other times, radish seed, or what is much cheaper, rape, may be sown between the turnip drills for the beetles to feed on, and save the turnips: or the turnips may be sown thick. If the seed leaves of the crop are devoured, as is frequently the case, the seeds will not again vegetate, and the ground must then be very superficially dug over, and another sowing made. Tobacco water and powdered quicklime may be sprinkled over the plants, but, it is believed, with doubtful success. The same may be said of the green or mealy fly, a sort of aphid, and several sorts of caterpillars, particularly a blackish one of a saw-fly, for which a flock of ducks turned into the crop to devour them is said to be effectual. The green-fly above mentioned, may, however, be effectually destroyed by sprinkling strong tobacco water over the young plants. Steeping the seed in various ways must be idle, and may be injurious; it can never do much good. Even were insect eggs laid on the seeds, which they certainly are not, no steep would kill them without killing the seed.

When the plants escape their enemies, and are just beginning to form their third or rough leaf, they ought to be successively thinned out to nine inches between each, which

is no less important than careful weeding. As turnips often suffer much from drought, they should not be thinned too freely; but having the several thinnings done in time is important, or they will grow weakly and never form good roots.

When weeding with the hoe, no earth ought to be drawn up to the roots, as this is apt to produce bulgings or what are commonly termed fingers and toes, and the leaves will afford the roots sufficient shade to preserve them from becoming green and acrid.

The winter sorts afford excellent greens early in spring, which are much used by all classes in London for the table; and if they are suffered to remain in the ground till the spring, two or three successive crops of these greens will be produced.

A few plants of the several sorts may be allowed to stand for seed, as distant as possible from each other, or from any flowering cabbage, to prevent cross-fertilisation by the bees or wind.

When an early crop is wanted, seed may be sown (taking care afterwards to scare the sparrows) in open weather, from January till April, but it is not to be depended on, and is not profitable.

7.—*Radishes.*

The Radish is composed of nearly the same constituents as turnips, but being eaten raw, the chief nourishment it affords is its fibre and its nitrogen, on the last of which its flavour principally depends.

It grows naturally in China, and sometimes here, as a weed, in similar situations to the wild turnip, but thrives best in the garden, on deep open loam, or a well-manured sandy soil. It differs materially from the turnip as to the seasons for sowing, which are successively from the beginning of January till May-day, not later, and from the end of August till the middle of October. Except in a cold wet summer, no good radishes can be grown from the middle of May till September; though where a border with a northern aspect is afforded, they may be grown to advantage through the whole of the summer, taking care to sow

them thickly, or allow them an abundance of water. In very hot summers, they are an exceedingly refreshing food, and may be made to form a part of almost every meal.

For the early and the autumn crops, the short top, salmon, scarlet, and long crimson, are the best ; for the late spring, summer, and early winter crop, the red or early white turnip-rooted ; and for winter, the black Spanish ; but this, like most hardy plants, is not very excellent.

Having prepared a piece of ground of the required size, by manuring and digging it, sow the seeds broadcast on the soil thus dug, and then tread the ground carefully over, after which it should be well raked, in order to bury and scatter the seeds. Sowing in drills is a bad practice, as it exposes the plants too much to heat and drought ; and covering them too deeply with soil is still worse, for radishes cannot be sown too near the surface of the ground. Nevertheless, a few drills between rows of beans and peas in summer will answer admirably. As soon as the seed is sown, the bed or plot should be covered with dry stable litter, to the thickness of two or three inches. This will effectually keep off the birds, which are very partial to radish seed, and will devour the whole, if they are not thus prevented ; it will also cause the seeds to germinate much more speedily, and ensure a better crop. When the seed begins to vegetate, the litter may be removed entirely if the season is warm, but in the spring it should only be taken off in the day time and replaced at night, to prevent any injuries from frost.

For a bed three feet broad and nine feet long, one ounce of seed will be enough for spring varieties, and three quarters of an ounce for autumn and winter varieties. When sown too thick, they are apt to be woody or to run to seed. But it is always safer to sow moderately thick, in order to allow for bad seed and depredations by birds.

The turnip flea, already mentioned, is said to prefer radishes to turnips, but owing to the time of sowing, the early and late, but not the summer crops, are safe from this pest. Some plants of the earlier crops may be transplanted for seed, keeping the sorts apart to prevent cross-

ing. When the lower pods are ripe, take up the plants and hang them in a shed to dry. If radishes are sown broadcast over a piece of ground that has been planted with potatoes, the crop will be fit for use by the time the potatoes are above the ground, and this is a very good and economical plan.

II.—STEMS.

The plants cultivated in the kitchen garden for their stems, are onions, shallots, garlic, leeks, chives, celery, rhubarb, and asparagus.

1.—*Onions.*

The Onion is more used for its flavour and stimulus than for the nutriment it contains, consisting chiefly of fibre, with a little starch, which renders it pulpy when boiled, and not unwholesome, though it is not readily digested by weaker stomachs.

The proper soil is a rich loam, well manured the previous season, but no manure must be used unless it be thoroughly rotted: the decayed manure from the bottoms of old celery trenches is well adapted for this purpose. An open exposed situation is indispensable. The time for sowing is about the 20th of March for a summer crop, and about the middle of August and the middle of September, for a crop to stand through the winter, and to be drawn and used in a green and young state in the spring.

For the summer crop, either red Strasburgh, or Deptford, or globe, or straw-coloured, or the white Spanish or James's, are the best sorts; and for pickling, the small silver-skinned may be sown. For the winter crop, or an early spring crop, the Welsh is preferred.

For a bed four feet broad, and twelve feet long, an ounce of seed will be enough, when the plants are to be drawn young; when they are intended to mature themselves, half an ounce is sufficient.

Sow thinly broadcast on a finely dug and raked bed, or in shallow drills, a foot apart, beating or treading the seed well down, and covering it with two inches depth of earth. It is much better to sow them in drills, as they may thus

be more readily thinned, and the weeds removed with greater facility.

Weed carefully, and when the plants are three inches high, thin them first to three inches, and afterwards to four, six, or eight inches apart ; and where the seed has failed, or there are any defects in the crop, they may be filled up, by planting out some of the thinnings in damp weather.

It is important in weeding onions with the carrot hoe, not to stir the earth much, or raise it around the plants, which will prevent them from forming their bulbs properly. When the leaves begin to lose colour, bend them down at the neck, which will hasten their withering. This is likewise important where any of the crop manifest a tendency to grow into leaves instead of bulbs, as by bending them in this manner, the unnecessary luxuriance in foliage will be checked, and the nutriment which is thus drawn from the bulb will be returned to it, which will, of course, render it larger and finer.

Some sorts are much more liable to this defect than others, and it may be observed, that sorts which produce long bulbs are peculiarly so ; therefore, the round or flat kinds are preferable.

Onions must be taken from the ground as soon as the leaves are sufficiently withered, and, for this purpose, dry weather must be chosen. After leaving them on the ground for a few days to dry, they should be removed, and either placed on dry shelves, or tied up in bundles, and kept through the winter in a shed or outhouse, with due preservation from frost, though they are not very tender.

When very large onions are wanted, sow very thickly in the end of May or beginning of June, in good soil, or a month or two earlier, in very poor soil, as under a hedge or tree, some of the Spanish or Portuguese sort. These will not be much larger than a bean in autumn, and are to be kept for planting till the next March or April, in rows or drills, a foot apart, and eight inches between the sets. They must only be pressed a little into the ground, and no earth brought up to cover the bulb. Keep the ground clear from weeds by hoeing it frequently between the rows, and removing those by hand which come up between the

plants, and if any of the onions appear likely to run to seed, bend down their necks, as before directed ; they will thus grow from four to six inches in diameter. Those of the autumn sowing will also produce very large bulbs, if planted out in the spring in a similar manner. The tree onion may be planted in the same way, but is not profitable.

For seed, some of the larger ones may be planted out in rich soil, in spring, and it will be ripe in August, and must be well dried. It is important that every cottager should save a little onion seed, as it is frequently extremely dear; and as three or four plants for seed would occupy little room in the garden, and require very little attention, a great saving might generally be thus effected. The stems will require supporting with a stake as soon as they appear, but where the bulbs are planted in rows, two stakes at the end of each row will be abundantly sufficient, provided strings are fastened to each stake, and extended the whole length of the row on each side of the plants. If, after this, any of the stems should fall down, they may then be fastened to the strings, as, if they are allowed to lie on the ground, the seed will either vegetate or rot, both of which are to be avoided.

2.—*Shallots, Rocambole, and Garlic.*

These are similar to onions in appearance, and may be cultivated in the same manner, except that, as they do not produce seed freely, they are only multiplied by dividing the roots ; indeed, they produce new bulbs almost as abundantly as the potato, and therefore the seeds are not regarded. The separate parts of the root, called cloves, should be planted in April, either by dibbling them into shallow holes, or by merely pressing them slightly into the soil, and leaving them uncovered. They require no further attention, any more than to keep the ground clear from weeds, and when the leaves have attained their proper size, it is better to tie a quantity of them together in knots, which will facilitate their withering, and prevent the plants from running to seed. The leaves of shallots may be cut while green, as young onions, and are of a very fine flavour, though both the bulbs and leaves are much

stronger flavoured than onions. They may be taken up in the autumn, when the leaves are decayed, and preserved as onions.

Potato onions are planted with the bulbs half covered, in December or January, in good rich soil, a foot apart every way, earthing up as they advance in growth. They are dug up in July ; are very productive ; and as good as the Spanish kind.

3.—*Leeks.*

Leeks are similar to onions in quality, but are preferred for broths and other soups, and are nutritive and wholesome.

The soil requires to be rich, but not freshly manured, and the situation exposed. The time for sowing is early in March, and again at the end of April : the London tall, or the Musselburgh flag, being the best sorts.

Sow thinly broadcast, or in shallow drills, eight inches apart, afterwards carefully weeding and thinning out the plants to three or four inches apart.

For a bed four feet broad, and twelve feet long, an ounce of seed will be enough.

About the middle of June, or early in July, in a fresh piece of ground, hoe drills fifteen inches apart, and from four to six inches deep, into which transplant the leeks, when the size of swans' quills, from the seed bed with a dibble, six inches apart, leaving the drills open till the plants grow, and pushing only a little light earth into the holes in which they are planted ; when they commence growing, the drills are to be gradually filled, and the earth hoed up to the stems. If the weather be dry, give them an abundance of water, which may frequently be repeated if required. Gardeners generally use a dibble rather larger than usual for planting leeks, and make the holes very firm on all sides, by pressing the dibble against them, or turning it frequently round. These holes being ultimately filled with fine soil, it is considered that the leeks will expand in them to nearly the full size of the holes.

The practice of earthing up blanches the leeks, by keeping the light from the roots, and renders them milder. Planted in a level bed without hoeing, they are green, and of a much stronger and rank flavour. Seed may be saved

like that of onions, except that the plants intended for seed must remain in the ground all the winter, and in spring be removed to a warm border, where they will ripen their seeds better.

Leeks are perfectly hardy, and, therefore, must not be removed from the soil till they are wanted for use, as they are not capable of being dried like onions.

4.—*Chives or Syze.*

This plant has similar properties to the onion and leek, and is propagated by planting the small bulbs early in spring, in rows four inches apart, and two or three inches between the sets. Each bulb will produce a great number around it during the summer.

Chives are little known in England, but are found in every cottage garden in Scotland, usually grown in round patches, half a foot or more in diameter. The stems or leaves are cut when wanted for salads or soups, and are of a very mild and agreeable flavour. The roots are not eaten. The plant is useful for flavouring, and takes less room than onions; the stems springing up again after they are cut.

5.—*Celery.*

Celery, when blanched, contains both a little starch and sugar, but much more fibre, and is wholesome and excellent as a salad; when not blanched, it contains little sugar, but is wholesome in soups.

It grows naturally in a wet marshy soil, where it is extremely acrid and unwholesome; but it thrives best in rich loam, which contains a large portion of decayed vegetable matter or manure. It is an error to say that it requires a heavy or clayey soil, as is recommended by some, for the roots always thrive best in well-rotted manure, and a heavy wet soil about the stems would be highly injurious, both on account of its causing them to rot, and also because it cannot be placed sufficiently close to them without crushing them. Sandy soil is certainly objectionable, though not on account of its being too light, but because it is not sufficiently rich. The time for sowing is

from the middle of February, on a hot-bed for an early crop, till the end of March, or 20th of April, for a full crop.

For a bed three feet broad, and six feet long, a quarter of an ounce of seed will be found sufficient.

For the autumn crop the white is superior in flavour ; but the red is better calculated for standing through the winter ; the solid, or turnip-rooted, is not so sweet and agreeable as the others.

The seed is best when new, but will keep tolerably well for ten years. It ought to be sown in some warm rich corner of the garden, (a border with a southern aspect is the best,) and should, by all means, be sheltered at night, which may be done by bending some branches of willow, or other pliable wood, over the bed, and covering them at night with garden mats, or pieces of old canvas or carpet. These remarks, however, apply to the crop sown in March ; as, for the April sowing, protection is not indispensable, though occasionally useful. The seed bed should be raked fine, and the seed covered very lightly ; it will not come up for several weeks.

When the young plants have formed three or four leaves, prick them out four inches apart in a bed of rich soil, which must be first dug, raked, and rolled, or beat with the spade. After being thus pricked out, the plants will require shading in the heat of the day, as, not having many roots, they will be exceedingly liable to droop ; they may be shaded according to the directions before given for protecting them from cold.

The early crops should be pricked out under a hand-glass. This pricking out is for the purpose of checking the growth of the plants, to prevent them from running to seed, and to increase the root fibres, thus furnishing the plants with more ample means for obtaining food, and consequently ultimately tending to strengthen them. They ought to be well watered in dry weather.

In July for the early, and in August for the late crop, trenches must be made, five feet apart, a foot broad, and a foot deep. In the bottom lay four inches of well-rotted dung, digging it in, or placing over it a covering of three inches of rich earth, raked even, in which the plants, now six inches high, must be planted six inches apart, taking

care to remove all side shoots, if there be any, but none of the leaves, though it is better to deprive the leaves of their tops, as too great a surface of leaves would weaken and injure, perhaps destroy, the plants, by depriving them of too much moisture. A few laurel, or other evergreen branches, will be of great advantage to the plants, if placed over the trenches in the heat of the day, till they become established, as these will assist in keeping the soil moist, and also tend to prevent that excessive evaporation from the plants, so unavoidably attendant on the season at which they are planted.

A large supply of water is indispensable at this period of their growth, and they should be liberally furnished with it every night. If slightly impregnated with manure, it will be beneficial.

As blanching depends on excluding the light, the earth must be laid up in dry weather to the stems of the plants, taking care not to choke the hearts ; a little may be added every week or ten days, as the crop advances, always leaving about six inches of the leaves above the surface of the soil.

In earthing up celery, the soil used for this purpose should be broken very fine, and having been prepared with the spade, and placed along the edge of each row, the leaves of each plant should be collected together in one hand, while with the other the soil should be placed carefully about them. This process may appear troublesome, but it is absolutely necessary to prevent the soil from falling into the hearts of the plants, which either rots them, or checks the growth of the heart, and renders it useless.

Some gardeners use fine coal ashes for blanching celery, and where these can be procured, they are certainly preferable to soil, as they will not retain so much moisture, and the plants will be less liable to rot.

The deep trenches formerly used, keep the roots too much from the air, and the late September plantings should be placed in very shallow trenches. There is a system of planting celery in beds of four or five feet in width, and placing the plants in cross rows, a foot apart ; by this plan the beds are trenched out to the usual

depth, and the plants are earthed up by placing the soil between two boards, one against each row, and when a sufficient quantity of soil is thus prepared between the boards, they are carefully removed, leaving the soil in a ridge between the rows, which is then placed about the plants with the hand. This practice cannot be recommended, as it renders the plants more liable to rot. Though this plant grows naturally in moist ground, wet is more injurious than frost to the blanched plants, which are tender and easily rotted. In very severe weather, a small quantity of dry litter should be shaken over the plants to preserve them from frost. It is not a very profitable crop for a small garden, as it takes so much manure and room, but it is among the least unprofitable of mere garden luxuries, and may follow summer cabbages or kale; while the manure will prepare the ground well for any other spring crop the next season. One of the pricked-out (not the blanched) plants may be left to go to seed, which when ripe is to be hung up to dry. A small fly grub often deforms the leaves with white patches by mining into them. Celery should be principally eaten in the early part of the winter, before the severest frosts have occurred; as it always becomes more or less rotten during winter, and a large part of the crop is thus lost.

6.—*Rhubarb.*

The inside of the leaf stalks of Rhubarb, so much used in April and May for pies and tarts, contains some sugar, a good deal of pulpy fibre, and an agreeable and wholesome acid, consisting of the malic and oxalic acids.

There are many sorts of rhubarb, but the Elford and Wilmot's early are the best, though a sort raised by Mr. Myatt, Deptford, and called the Victoria, is now cultivated for the London markets, and produces immense stems. Rhubarb should be sown in the month of April, in a border with a northern aspect; the seeds should be scattered thinly in drills of about two inches in depth and a foot apart, and slightly covered with soil. When the plants appear, they should be thinned out to about six inches from each other, and afterwards to a foot, and the

thinnings may be planted in a similar situation if required, though in this case they must be taken up with care, so as not to break the roots. It is a bad practice to prick the whole of the plants out, as some recommend, for the roots would thus be greatly injured, and not the slightest advantage would be derived from it. No attention is required for the plants during the first year, except to keep down weeds.

As soon as the leaves are decayed, the seedling plants should be taken up with care, and planted out in rows two feet apart, and the same distance between the plants. When they are planted farther apart than this, a great portion of ground will be wasted, as they are not injured by being shaded by each other. Rhubarb should always be planted in a shaded or northern situation, if the garden contains such a one, as their stems will be finer and better when not too much exposed to the sun ; besides which, as most other plants require more light, these will thus occupy a situation which could not be made available for many others. Any rich soil will grow good rhubarb, which will require an annual top dressing of well-rotted manure ; this should be applied in the autumn, and, during the winter, the nutriment it contains will be conveyed down to the roots by the rain, and it will also cause the leaves to commence growing much earlier in the spring.

As seedling plants of rhubarb do not produce stems fit for use till two years after the time of sowing, if plants are desired to be obtained sooner than they can thus be brought into use, the old roots may be taken up and separated into as many parts as there are crowns or eyes, leaving a portion of the root to each ; these may be planted out where desired, and they will soon produce stems sufficiently strong for any required purpose. If the roots of a few plants are taken up in November, and planted in pots in a rich soil ; by placing them in a warm and dark place, the stems will be grown sufficiently by Christmas for affording a supply during the whole of this festive season. Or, if they are planted at the same time in rotten dung, which has been previously placed in a dark cupboard or shed, they will soon commence growing without the application of heat, provided they are kept sufficiently damp.

Though most rhubarb plants will produce seed, they should not be allowed to do so, and only a few flower stems should be left when seed is required, as they will exhaust the roots to no purpose.

This is an invaluable plant for small gardens, producing the means of making puddings and tarts from the spring till the end of autumn. If well manured, and grown in a shady place, it continues good all the summer; a circumstance that requires to be better known.

7.—*Asparagus*.

This is a very delicate vegetable, generally reputed to be an expensive one, but not wholly unprofitable, and producing a very elegant dish, besides being readily disposed of in any market. It is regarded more as a luxury, because generally eaten only when its stems have just pushed through the surface of the ground, at which time their points alone will be at all eatable. But if they are allowed to grow five or six inches above ground, a double or treble portion of edible matter will be produced, and the plant will consequently become to the same extent more profitable.

The seeds may be sown broadcast, or in drills one foot apart, on light rich earth, in the month of March, and slightly trodden in and covered. The young plants will simply require cleaning till the autumn, when they can be covered with litter or light manure, and planted in their permanent places in March following.

Asparagus should be grown in beds, about four feet wide, with the rows nearly a foot apart, and the plants six inches from each other in the rows. It requires a light rich alluvial soil, which should be well replenished with rotten manure. Between each bed, there should be an alley left, two feet in width, into which all the weeds are usually drawn during summer, and well dug in about the early autumn. From these alleys, a portion of soil, enriched with rotten manure, should be dug every spring, and laid on the beds to the depth of three inches. This will supply a light medium for the stems to pass through, and furnish fresh nutriment to the roots at the same time. Strong soils

are bad for asparagus ; and everything else that would obstruct the growth of the stems should be carefully picked out.

In about two or three years, the beds will come into bearing, when they should only be cut over lightly. Afterwards, they may be cut more severely ; but a quantity of stems should always be left to grow up and seed, or the plants will soon become enfeebled.

III —LEAVES.

The plants cultivated in the Kitchen Garden for their leaves are Cabbages, Savoy, Kale, or German greens, Broccoli, Cauliflower, Spinach, Lettuce, Endive, Cresses, Mustard, Parsley, and Herbs.

1.—*Cabbages.*

One thousand parts of Cabbages contain forty-one parts of starch, twenty-four parts of sugar, eight of gluten, and the rest water, fibre, and nitrogen, on which their flavour chiefly depends.

They are wholesome, and, though not quite so nutritive as is sometimes represented in books, are, with the exception of potatoes, the most profitable garden crop that can be grown.

Cabbages will thrive well in any richly manured soil, provided it is not too dry, for they will not endure drought, as they have but few roots to enable them to provide against it, and by exposing a great extent of green leafy surface to the atmosphere, evaporate much, and consequently require a greater supply of moisture. A stiff clayey soil is therefore more suitable for them than a sandy or gravelly one, though the autumn or winter crops may probably succeed better in a soil of the latter description, as these seasons of the year are generally wet ; in summer, also, the plants will arrive at maturity sooner in such soils, though they will be much smaller. But neither of these extremes are suitable for cabbages, and a rich loamy (not clayey) soil is the best for them.

The time for sowing is very important, and should be regulated according to the time the crop is wanted.

For a late spring and early summer main crop, the sowing must not be made much sooner than the 10th of August, or they will be too forward, nor much later than the 25th of the same month, or they will not be forward enough. For young greens in summer, and full heads in autumn and winter, sow in a warm border in September, and at short successive intervals from February till the end of June.

The sorts, like the sowing, will depend on the time the crop is wanted ; and hence it is important to get genuine seed. The quickest growing are the early dwarf, which comes first, the early sea-green, and the early York, which are of course best for spring sowing, and also for the first August sowing. The sugar-loaf, Battersea, and Wellington, are larger, and come a week or two later to succeed the earlier. For young greens or collards, the imperial and London collard are the best, or rather the vanack, which, by successive sowings, is always in season, and excellent for greens, white hearts, and sprouts. The drum heads, flat Dutch, and round Scotch, are large, coarse, and not so suitable for gardens as for field culture.

The sugar-loaf is one of the mildest and best of cabbages, and grows into a compact close head without ever getting very hard. It has a sweetish agreeable flavour, and is entirely destitute of the rankness which often renders cabbages indigestible for weak stomachs.

For a seed bed four feet wide and ten feet long, one ounce of early York cabbage seed will be enough.

Sow thinly broadcast in a finely dug and raked bed, or rather in drills six or eight inches apart, which may be beat after sowing with the spade, or trodden firmly down, covering the seed with about one inch depth of earth.

The seed leaves are apt to be devoured by the same small beetle which infests seedling turnips ; though this is only the case with such as are sown between May and August, as has before been observed with respect to turnips. Slugs are also very destructive, and a quantity of quicklime should be scattered over the ground early in the morning ; if this does not effectually destroy them they must be picked off by the hand very early in the morning, and plunged into a garden pot filled with quick-

lime, which will speedily kill them. The green fly or aphid is also sometimes found on the young plants, in which cases, they should be sprinkled with tobacco water, though this remedy will certainly affect their flavour. In hot and dry weather, the seed beds will require a good supply of water, though for summer sowings a cool and shaded situation should be chosen; but with early and late sowings, a warm south border is best.

After the young plants have escaped all these enemies, they should be carefully weeded and thinned out to about one or two inches from each other, for if this is not done, they will grow long, weak, and slender, and will never afterwards become so large and fine as those that are treated in this manner.

When they have acquired about six leaves, they should be pricked out into another bed or plot of ground, taking care not to break the roots, and to have as much earth as possible attached to them. To effect this, they should be well watered on the previous day, and should be taken up with a small three-pronged fork, for if they are drawn without being thus loosened, the roots will be greatly injured, and no soil will adhere to them. Always cut off the extremities or tails of the roots, that is, the long tapering root that descends from the centre of the stem perpendicularly into the soil; as this operation will increase and facilitate the formation of fibrous roots.

The nursery bed must be of good rich soil, well dug, and the plants dibbled into it in rows of half a foot apart, and four inches between the plants; after planting they should be liberally watered, and also on future occasions when required.

Of the few operations to which cabbage plants are subjected, that of pricking them out is the most important for producing large cabbages, as the plant is thus induced to form a greater abundance of root fibres, which afterwards provide it with a larger supply of food and nourishment. At the time of performing this operation, the plants should be sorted, so as to collect all those of the same size together; otherwise, when afterwards planted out, the crop would come in irregularly, for the larger plants will always be ready for use before the smaller

ones ; although, in small families, this will sometimes be an advantage.

When any little knobs or clubbings are seen bulging on the roots, they ought to be pared off with a sharp knife, as they often, not always, contain a burrowing grub, which checks the growth of the plant, and which also becomes a little sharp-beaked weevil that eats the young leaves like the turnip flea.

When the plants, thus pricked out, have attained the height of five or six inches, and have acquired thick straight stems, and an abundance of root fibres to support them and provide them with food, (which they never would have done if they had been suffered to remain all this time in the seed-bed,) they may be planted out where they are intended to stand, in a well-manured, fresh-dug plot, and in a situation where they will be freely exposed to light and air. The various sorts will require to be planted at different distances from each other, according to their size, also considering whether they are intended to be cut young, or in a state of maturity. The rows should be a foot apart for dwarf sorts ; a foot and a half for the York and sugar-loaf kinds ; and two feet for the larger sorts ; while half a foot will be sufficient for those which are required for young greens or collards in the spring. The distance which the plants should stand from each other in the rows, must be regulated according to the preceding directions, and should be about two-thirds of that which is left between the rows ; for instance, where the rows are a foot and a half apart, the plants should be a foot from each other in the rows, and so forth. In the case of spring collards, every alternate plant may be pulled up for spring use, and the remainder, if left, will afford an excellent summer crop, though this may depend entirely on the option of the cottager, or person growing them.

The plants intended for planting out, must be taken up carefully with a fork, as before directed for removing them from the seed-bed ; the roots should also be preserved entire, and have as much soil attached to them as possible.

Both in pricking out, and in the final transplantation, if the ground is very dry after making the dibble holes, fill

these with water, putting in the plants as deep as the leaves will permit. When plants are required to be placed out in excessively dry weather, they will derive much benefit from being subjected to an operation termed by gardeners *puddling*; when they may be immediately planted, and by being frequently watered afterwards, they may thus be planted with perfect safety in the driest weather. It is, in all such cases, of the utmost importance, after a plant is put in the hole, to press the earth very firmly to the root fibres (not the upper part of the root) with the dibble, to force them as it were to feed in their new place. If a plant will come readily up when pulled by either of the leaves, it is badly planted, and will never thrive. It is also important to keep the ground clear of weeds, and to stir it several times with the hoe or spade, to give the root fibres, now accustomed to their new place, freedom to spread; and also to draw up the earth to the stems, to encourage fresh root-fibres to grow there, and preserve the roots moist. Mr. Lee, however, disapproves of earthing up in light ground. Take off the large outer leaves, particularly when yellow, to give light and air.

When the cabbages have been cut, if the ground is not immediately wanted, the stumps, particularly of the vanack sort, may stand till a crop of sprouts is obtained. Or, where the ground is required for another crop, they may be taken up, with large balls of earth to the roots, and planted in a trench in any spare corner of the garden, at half a foot apart, always observing to deprive them of all their old leaves as soon as the head is cut off, whether they are transplanted or not, that the young sprouts may not be robbed of their nourishment. A plant or two in this trench may be allowed to remain for producing seed.

In saving seed, the sorts can seldom be got genuine unless the plants be kept at considerable distances asunder; and even then bees and other insects will often occasion cross-breeding. The seeds taken from the top will produce much earlier cabbages than those taken from the bottom or side branches.

Red Cabbage seed may be sown either in August, or the end of March. The plants require to be placed in an open exposed situation, and at a tolerable distance from each

other ; they will be of little use to a cottager, but meet with a ready sale in the market. They should be cut just before or soon after the first autumn frosts, or a good deal of each plant will be wasted by becoming rotten.

2.—*Savoy*.

This is a curly or puckered sort of Cabbage, of similar qualities to the other sorts, and cultivated exactly in the same manner, but only for a winter crop, which is very profitable.

The soil may be drier than for summer cabbages, though it should be rich and well manured. The time of sowing is from the end of March till the middle of April, or a month later for young greens, planting them out late in July till August. The dwarf green is the least, and the large yellow the most hardy sort. Both are said to derive much benefit from frost, which deprives them of that strong rank flavour which they possess when they are not subjected to it, and also renders them more tender.

If, after the heads are cut in February or March, the stumps are placed in trenches, as directed for cabbages, they will produce good sprouts, which have been found to remain tender and good even when shooting for blossom.

3.—*Kale, German Greens, or Borecole*.

This is a sort of cabbage that does not form a solid head, and is similar to the Savoy, but milder, hardier, and better calculated for standing the frost. It also produces more sprouts than cabbages or Savoy, and these are ready in spring, when there are no other greens to be procured.

The best sort is the green curled, the purple being inferior in tenderness. The same time for sowing, and the same mode of management, are required as for Savoy.

A sort of perennial kale has been introduced at Woburn, which is very hardy, and does not require to be yearly raised from seed like the others, but increased from cuttings or slips. It is much coarser in quality than the preceding.

4.—*Brussels Sprouts.*

The vegetable called Brussels Sprouts is a variety of the Savoy, producing some thirty or forty cabbages, less than an egg, around the same tall stem, in addition to the head, and of excellent quality.

The cultivation is very similar to that of the Savoy, the sowing being in March or April, planting out in July into good rich soil ; but about Brussels they rear successional crops, that come in from the end of July to the end of May.

What are usually termed Brussels Sprouts in England are seldom genuine, in consequence of the seed being crossed by other sorts ; and, some think, on account of its being saved both from the main stem and the side branches. The latter opinion appears very doubtful, till proved by experiment. These and curled kale are decidedly the best winter greens, and both will continue sprouting until the blooming season, the young shoots being, if gathered before they have grown too long, exceedingly agreeable and tender.

5.—*Broccoli.*

Broccoli is a sort of cabbage, with similar properties to the other sorts, but the part used is different, being the head formed by the flower buds.

The soil requires to be richer than for cabbages, and to be often moistened, if possible with liquid manure. The time of sowing is precisely that of the cabbage, and the after management is the same, except that the plants will require rather more room, and more earthing up.

The sorts are numerous, but the chief are the early purple and Knight's protecting, which ought to be sown in the second week of April, the third week of May, and the last week of August, for successions. The early white, the green Cape, and the cream-coloured, being less hardy, may be sown in a warm border in the end of February, the beginning of March, or not later than April.

When a quantity of broccoli comes in all at once, and is not wanted, a few of the leaves may be snapped, and turned

down over each head, which will keep it white, and tend to check its further development. This plan will also serve to protect it from the late spring frosts.

It is very doubtful whether any sort of broccoli, except the early purple, be a profitable crop in small gardens, as the produce will rarely be in proportion to the ground occupied, not to speak of manure and trouble. Portugal kale, or couve tronchuda, lately introduced, is also unprofitable, except for marketing. Purple broccoli will continue forming numerous heads long after the first and principal one has been cut.

6.—*Cauliflower.*

The cauliflower and broccoli are only varieties of the same species ; the head of the flower buds in both being the part used. But as it is nearly impossible to rear early cauliflower without a hot-bed to sow the seed, or hand-glasses to shelter the plants in winter, which the produce will not profitably repay, it does not come properly within the design of this work. In the summer of 1833 we had a number of plants given us, that had been well nursed under glass the preceding season : but though these cost nothing, the ground in which they were planted would have made a more profitable, though a less delicate, return of cabbages, except for marketing.

For a late summer or early autumn crop, cauliflower may, however, be easily reared, by sowing the seeds on a warm border in March, and planting them in rich ground as soon as they are ready. Another sowing in April will bring the crop down to the occurrence of autumn frosts. Coming in during the hot summer weather, and lasting till the first frosts are experienced, it is more necessary to break down the leaves of cauliflower, to cover the heart, than it is in the case of broccoli.

7.—*Spinage or Spinach.*

Spinach is composed of a very little sugar, a great deal of water and pulpy fibre, and is very wholesome, and not unprofitable as a crop.

The soil requires to be rich to produce large fine leaves

though spinach will grow even in the poorest soil, if well manured. The time of sowing for a winter crop, to come in from November till May, is from the middle of August to the 8th of September; but if frost occurs soon after the latter sowing, it will seldom survive the winter. For a summer crop, to come in after the winter crop has run to seed, the end of April is the proper time; though, if an August sowing have been neglected, seed may be sown in the end of February or even in January. When sown in June and July, it will run rapidly to seed. But a succession of small sowings from the beginning of April to the end of June (using the round-seeded sort) will keep up a constant supply. It makes a delicate and pleasant dish.

The sorts are the prickly-seeded, or what is better, the Flanders, for the August sowing, and the round-seeded for spring.

For a bed five feet wide and twelve feet long, an ounce of seed will be enough; or half an ounce for the same space drilled.

Sow thinly broadcast in a finely dug bed, or rather in very shallow drills six or eight inches apart; or, as some prefer, double that distance, with rows of radishes or lettuce between, treading it well before raking. The earth over the seed should not exceed the third of an inch, for if much thicker, the seed will be lost.

Sparrows and other birds, if not prevented, will endeavour to purloin the whole sowing, as has frequently occurred within our knowledge; and when the young plants come up, pigeons, if they get at them, will devour the whole. Careful weeding, and hoeing up the earth, so as not to choke the hearts of the plants, are indispensable. Thinning also must be duly attended to, and the plants should be left three or four inches apart. If a few plants of the winter or spring crops are allowed to remain, they will produce an abundance of seed, which should be protected from birds. For summer crops, it is a good plan to sow the seed in drills, between the rows of peas, as the latter will afford it shelter and shade, and assist much in preventing it from running to seed; besides which, the ground will thus be better and more profitably occupied.

White Beet of the curled sort, and several wild plants

and weeds, such as *Good King Henry*, *Goosefoot*, or *myles*, yield leaves little inferior to spinach. The *New Zealand Spinach*, lately introduced, is very productive and good, and may be sown in May. Two or three plants, which spread each three or four feet around, will give a tolerable supply for Sunday dinners.

8.—*Lettuce.*

Lettuce contains a little sugar, and a great deal of water and fibre ; besides a very bitter milky juice, in the stems, which, when dried for medicinal purposes, and taken in doses of three or four grains, produces sleep, and in an immoderate dose, would prove fatal like laudanum. This milky juice, however, does not seem to exist in any quantity in the parts of lettuce used, which are wholesome, good, and profitable.

The soil for lettuce must be light and well manured, and the situation very open, or the crop will not be fine. The time of sowing is from the last week in February, if the weather will permit, successively every fortnight, till the first of May, after which the plants will run to seed rather than form hearts. Another successive sowing may be made from the beginning of August, every week, till the middle of September.

The sorts for the spring sowings are the green, white, and Bath cos, the Marseilles, or Prussian endive-leaved, and the black-seeded gotte. If any artificial heat is at command, to forward the plants which are fit to prick out in March, it will be an advantage. For the first August sowing the same sorts will do ; but for the later sowings the Grand Admiral, the Hammersmith green cabbage, brown cos, and black-seeded gotte lettuce, are the hardiest for standing the winter, though, except the black-seeded gotte, and the brown cos, they are by no means so good as the others, which, without covering with fern leaves, hoops, and mats, or with glass, will seldom outlive sharp frosts. Plants for standing through the winter should always be planted out from the seed-bed, as, if they do not receive this check, they will grow too large and tender before the frosty weather appears, and will almost inevitably perish.

It is generally unsafe to attempt preserving any lettuce through the winter without protection.

For a seed-bed three feet broad and seven feet long, one eighth of an ounce of seed will be enough, and will produce about two hundred plants.

Sow thinly broadcast on a finely dug and raked bed, or in shallow drills fifteen inches apart, covering the seed very slightly with soil. Weed carefully, and when the plants are an inch or two high, thin them to four inches apart, and when five inches high, to ten or twelve inches apart, hoeing them up at the same time, and planting out those which are moved into a separate plot, taking care to water them then, and for some days afterwards. Being a very juicy plant, it requires to be grown rapidly, and any great check spoils it. Showery weather should therefore always be chosen for transplanting it; or, when this cannot be secured, the evening of the day is the best time.

Earth-worms will be apt to draw into their holes the pricked-out plants; and pigeons and other birds, as well as slugs and night-feeding caterpillars, will devour the leaves, if care be not taken to prevent this. A few cabbage or larger lettuce leaves strown about among the young plants, for a few days or a week after planting, will serve as a good decoy for snails and slugs. They are often sown with advantage amongst onions, and in alternate drills with spinach, radishes, or potatoes. One plant of a sort permitted to stand, will produce abundance of seed, which must be gathered by hand as it ripens, or it will blow away. Lettuce may be blanched as directed for endive.

9.—*Endive.*

Endive has similar properties to lettuce, but is more bitter, and not so palatable, though the curled sort is prettier in appearance when blanched. The small Batavian is the best.

For a seed-bed three feet broad and seven feet long, a quarter of an ounce of seed is enough.

The seed should be sown precisely like that of lettuce, in rich soil, from the middle of June to the third week of July, or later. Weed the bed carefully as soon as the plants appear, and thin them to two or three inches apart.

As soon as the leaves of the plants are two or three inches long, prepare a piece of ground, in an open and warm situation, for their reception, by digging in plenty of rotten manure, and make shallow drills with a draw-hoe, about an inch and a half deep and a foot apart; into these drills plant the young endive in cloudy weather, at a foot asunder, and water them well if the weather is at all dry, repeating this frequently afterwards. If the seed is sown in drills, the plants should be successively thinned, till they are a foot from each other, and the thinnings planted out in the manner above directed, while those that are left will grow much larger and finer than if they had been planted out, as endive thrives better when not transplanted. The object intended to be accomplished by the drills, before recommended for transplanting the young endive into, is to preserve the plants from drought, and retain the water about the roots that is applied artificially.

To blanch endive, (and the same system will do for lettuces, if required, or cabbage,) on a dry day gather up all the leaves, and tie them up with a piece of string, if no bass is at hand, which latter is much the best material for this purpose. They ought to taper at the top like a sugar-loaf, so as to keep out rain. In a fortnight or more all the inner leaves will, for want of light, become white.

It is well known that all blanched plants soon rot, and therefore only a few should be blanched at a time. Endive is seldom used, except in salads dressed with oil and vinegar, which, though very common among the poorer classes on the Continent, are by no means so even among the middle classes in Britain. The wild endive, a native of Britain, is planted on the Continent for the roots, which are roasted and used as coffee.

10.—*Cresses.*

The garden Cress, of which the curled sort is the best, contains a good deal of nitrogen, on which the flavour chiefly depends, and the same may be said of American or Belleisle cress, water-cresses, and scurvy grass.

For a bed three feet broad and five feet long, an ounce of seed will be enough.

The seed may be sown in shallow drills, a little successively every week in spring, summer, and autumn, by those who like it cut in the seed leaf; but one sowing will last many weeks if it is not cut till in the fourth or fifth leaf, as many prefer it. These remarks apply to the common garden cresses, but the curled cress will remain good for a great length of time, if the outside leaves only are picked off, as it will soon produce more, and in this respect is exactly like parsley. In winter it may be sown in pots kept in a window, or on what are termed pyramids, or even on moistened sponge or flannel. In sowing seed of the common garden cress, or of mustard, as it is not required to produce large or strong plants, air may be wholly dispensed with; heat, darkness, and moisture, alone being necessary to induce it to germinate. It should always be sown on the surface of the soil, and never covered with it, for when it is covered with earth, it is much longer in vegetating, and the more rapidly it is grown the more tender will be the crop, and also more agreeable in flavour. In order to render a covering of soil unnecessary, the sowings, whenever they are made, should be covered with a piece of garden mat, old carpet, flannel, or other similar material, and by keeping these constantly moist, and having a moderate degree of heat, the crop will be fit for use in five days or a week. Articles of this description, however, must be removed as soon as the seed begins to vegetate, and the produce of the sowings that are made out of doors, will always be better if a hand-glass is kept over them, though this is not essential. A warm southern situation is also preferable. But these remarks apply chiefly to the common cress; as the curled cress may be sown on any border, and covered about a quarter of an inch with soil.

Scurvy grass, when seed can be procured, is treated similarly to cress, and has the look and flavour of water-cresses. American cress may be sown in April or May, and will stand the winter. Water cresses have lately been cultivated to a great extent near London, and ought never to be neglected where water can be had to grow them. Seed from all these is easily saved, taking care to select fine plants, and water-cresses will grow readily from cuttings.

11.—*Mustard.*

Mustard is similar to cresses and scurvy grass in qualities, and is best when mixed and eaten with garden cress. It is sown exactly like the garden cress, but is not good after it has passed the seed leaf.

To save seed, sow in spring, in rows two feet apart, thin the plants to six inches from each other, and when ripe, cut, dry, and thresh it. A row three or four yards long will produce an abundance of seed for one year's successive sowings for a small family.

Curled Chervil, Lamb's Lettuce, or Corn Salad, Sorrel, and some other plants, are sometimes sown as small salads. The former of these may be treated as directed for parsley, while Sorrel, which lasts several years, may be multiplied by dividing the roots.

12.—*Parsley.*

Parsley is chiefly used to flavour soups, and to garnish dishes. It is wholesome when boiled. The seed may be sown in shallow drills, either to form an edging along the verge of a plot of ground, or a foot from the edging ; or, it may be sown broadcast in a small bed or border. In either case the plants should be thinned to about four or six inches from each other, and kept clear from weeds. It is worthy of remark, that parsley will grow well under the shade of trees, where few other vegetables would thrive.

It will run to seed the second year, and therefore some may be sown in March, which will be fit for use in the summer, and remain good till the succeeding summer. By cutting off the flowering stems it may be kept good for more than one year, but a succession of young plants is far preferable. Curled parsley is the best, and is very marketable in winter.

13.—*Sweet Herbs, &c.*

Mint, Thyme, Sage, Savory, Marjoram, Hyssop, Lavender, Balm, Rue, Fennel, Chamomile, Southern-

wood, and the like, are all easily cultivated, either by seed, by cuttings, or by dividing the roots, and may be planted in the borders, or in the corners of the beds allotted to the larger crops. Hyssop, Lavender, Sage, and Rosemary, may be multiplied by taking off slips of a moderate size in the autumn, as soon as the plants have ceased flowering, and planting them out where they are required, with a dibble. If the slips are taken from the base of the plant, and have a few roots to them, they will be much more likely to succeed. Fennel produces an abundance of seeds, which vegetate most freely ; indeed, unless young plants are required, it should not be allowed to go to seed, as the seeds will scatter themselves, and it will be difficult to exterminate it. Mint may be readily propagated by pieces of the roots, which spread with great rapidity, and a very small piece will grow ; it requires a moist soil, and will grow in any shaded situation. Thyme, Balm, Chamomile, Savory, and Marjoram, are easily increased by dividing the roots, and the two latter by seeds, if required. Rue and Southernwood can only be multiplied by cuttings, or what is better, by slips, though the former of these occasionally ripens seeds. Any common soil will suit herbs of this description.

It is well to keep up a succession of young plants, as the old ones soon become unsightly or straggle about.

IV.—SEEDS.

The plants cultivated in kitchen gardens for their seeds, are Peas, Beans, Kidney Beans or French Beans, and Scarlet Runners.

1.—*Peas.*

Peas, when fully ripe, contain, in one thousand parts, five hundred and one parts of starch ; thirty-five parts of gluten, twenty-two parts of sugar, and the rest fibre ; but when green, their sugar is in much larger proportion than their starch, so that green peas are a luxury by no means so nutritive as ripe peas.

The best soil for peas is one light and rich ; but with

care they will grow on any soil, if it be well manured when too poor or dry, and well drained when it inclines to be wet, as it is then apt to give more straw than pods.

From the last week in February or even of January, to to the beginning of June, or July, are the times for successive sowings. The seed should not be more than one year old ; and one pint of seed will be sufficient to sow four rows, each five yards long.

For the early crop the best sorts are the early frame, and Bishop's early dwarf. For a later crop, the Prussian blue, Egg pea, Spanish Marotto, and Knight's marrowfats, are preferable. The whole pods of sugar peas are eatable, but these are more curious than useful. Charltons and Hotspurs are only known in books, and cannot be procured.

To allow due exposure to light and air, the early dwarf sorts should have the drills three feet apart ; such as the Prussian blues, four or five feet ; and the tall marrowfats, and Knight's green, six or seven feet asunder. In a moderate-sized garden, it is a good plan to sow the rows of peas from twelve to twenty feet apart, filling up the intermediate space with cabbages, onions, carrots, parsnips, French beans, or any summer crops. In practising this latter system, however, the rows should run parallel from north to south, not from east to west, as each side of the rows will thus be exposed to the sun, and the crops grown between them will not be shaded by them. It will always be safest to sow pretty thickly, to allow for all kinds of accidents.

Peas should always be sown in double rows, that is, two rows should be sown nine inches from each other, as, by this method, much ground will be saved, and they will not require more than half as many stakes as they would if sown in single rows. The drills should be made full three inches deep, and as level as possible at the bottom, so as to have the crop of a regular height and size. Sow the seed moderately thick, to allow for the depredations of insects or vermin, and having trodden it in, cover it with the same depth of soil as that taken from the drills, after which, again tread the surface of the soil.

Fowls should never be allowed to enter the garden, or

they will scratch up the seed, and pigeons, sparrows, and other birds must be frequently scared, or they will pull up the whole of the crop after it has appeared above the ground. But perhaps the enemies which are most to be dreaded are mice, which frequently devour the whole crop soon after it is sown, by burrowing into the ground for it. The only way to prevent this is to set a number of mouse traps, of any kind, along the side of the rows, with some attractive and strong-smelling bait, into which they will generally find their way, when they may be destroyed.

Slugs and snails will also at this time devour them, and ought to be sought for at night and killed, or quick-lime sprinkled between the rows. The green fly, a species of aphid, which attacks the crop when more advanced, may perhaps be killed by a sprinkling of tobacco tea, or the leaves and tops attacked may be cut off into a dish, with a pair of scissors, in order to prevent the aphides from travelling away.

Digging between the rows, particularly when the blossoms show, and earthing-up or flat-hoeing several times, must be attended to as well as weeding, in the same way as for a potato crop.

It will be important, as soon as the tendrils or claspers appear, to fix stakes along the rows, four feet high for the dwarfs, five or six feet high for those of middling height, and seven to nine feet high for the tall sorts. These stakes should have as many branches or twigs on them as possible; and the young shoots or brush-wood, produced from the stems of old elms, are the best for this purpose.

Pinching off the top shoots, when the second or third set of blossoms appear, will promote the filling of the pods. It is not advisable, in a small garden, to attempt growing peas for seed. In no way indeed are peas a profitable crop, except where there is abundance of room to spare, or when they are reared for market, where they usually sell well.

Where a very early crop of peas is required, (which, however, is extremely unprofitable,) they must be sown in the month of October or November, in a very sheltered situation, and one which is well exposed to the south; and

as soon as frosts become prevalent, they should be well earthed up, and staked. If branches of beech can be procured for this purpose, as these generally retain their old leaves through the winter, they will afford ample protection to the crops; but if some branches of spruce-fir are placed on the outside of the other stakes, and removed during the day in fine weather, they will stand through the winter perfectly well: or, a sowing may be made in pots early in February, and kept in the house, turning them out in March or very early in April, after having gradually inured them to the open air. By either of these methods, green peas may be obtained considerably earlier than those sown in the spring, but the crops will not be so abundant, nor the pods so well filled. Very late peas are similarly unprofitable, as they generally get more or less mildewed, when the produce is either lost entirely, or becomes scanty and inferior.

2.—*Beans.*

Beans, that is, broad Windsor or long-pod beans, have very similar proportions of starch to peas, but rather less sugar. Their greater size renders them a more profitable crop than peas.

The best soil for beans is a stiff heavy loam, and therefore, when a soil is light, the seed should be firmly trodden in before it is covered with earth. The time for sowing is from the end of February to the beginning of July successively: and for very early crops, in October or November. Small and frequent sowings will be most desirable, where they are grown for family use; otherwise, they come in all at once, and are thus frequently wasted, or become old and disagreeable.

For five rows, each five yards long, one pint of seed will be enough in early sowings, and a quarter of a pint more for late sowings.

For the early crop the best sorts are the Mazagan and early long pod; for the full crop the broad Windsor or long pod: the seed not more than one year old. These and all other sorts of beans should only be sown just where each plant is wanted, as, if the seed be good (and this is

easily decided by the plumpness of its appearance) scarcely any of it will fail.

When sown in drills, these should be exactly similar to those for the dwarf sort of peas, with subsequent similar diggings and flat hoeings, but they will not require so much earthing up. When a crop of beans is intended to be produced between the rows of cabbages or kale, it will be much more convenient to sow the seed in beds in a warm border, and plant them in the required situation by a dibble when they are about two inches high. Beans, like peas, should always be grown in double rows, and where they are to be dibbled out, shallow drills should be made for this purpose, and the young plants placed in them at four inches apart, as soon as they are one or two inches above the surface of the ground ; for if they are left too long in the seed bed, they will never succeed well afterwards. They should be liberally watered at the time of planting, as well as on any subsequent occasion when they may require it. It is a very profitable plan to plant rows of beans at four or five feet distant, and place cabbages or other crops between them, as directed for peas.

Early crops may be obtained by sowing in pots or frames, and transplanting in March.

The depredations of mice must be guarded against ; and, when the plants are just coming into bloom, the dolphin or black fly, a sort of aphid, which first attacks the top and then spreads in myriads over the leaves, will commit frightful ravages if not checked. The bean crop was nearly destroyed by them in Scotland in 1833.

The best remedy is cutting off the parts attacked with a pair of scissors into a dish. Even when the dolphin does not appear, it is advisable to take about an inch from the top of each bean plant, as this will prevent them from growing any higher, being much blown about by winds, and exhausting their strength to no purpose ; while, by turning the course of the sap, it will cause the beans to swell much better, and render them much finer and larger. This should be done just as the first blossoms are beginning to fade. It is not profitable in a small garden to save seed. When, through the occurrence of violent winds, beans are thrown down, they must be supported by a few

stakes placed here and there along either side of the double rows, with tightly drawn string between them.

3.—*French or Kidney Beans.*

Kidney beans, as eaten along with the pod, contain some starch but more sugar in the young beans, and some sugar but more fibre in the pod, and are very wholesome and nutritive.

A light dry soil is almost indispensable, for much wet causes the seed to rot. The time for sowing is from the last week in April to the middle of July. If sown earlier without protection, the frost will almost inevitably destroy the young plants: they may however be sown in a sheltered seed-bed, and planted out in May.

For an early crop, the best sort is the speckled dwarf; for the next, the negro or Battersea, the dun-coloured, and the white Canterbury.

The drills should be two feet or more apart, and the seed (not trodden down) covered with two or three inches' depth of earth. French beans are generally used in a dry state for soups, and for this purpose the white Canterbury is the best.

In the London nurseries, every spare corner, even between trees, is planted with French beans.

4.—*Scarlet Runners.*

Scarlet runners or white Dutch runners may be planted, in any soil which is not too damp, three or four inches asunder along the bottom of a wall, and trained to strong packthread; or they may be planted in the open ground at a distance of from four to six feet between the drills, and trained to sticks six or eight feet high; or along the two sides of a path, with sticks seven feet high, bent over to form an arch. As they are very exhausting to the ground, they should be well manured.

For four rows, four yards long each, half a pint of seed is enough. The seed may be sown at any time between the latter end of April and the middle of May, in drills two inches deep, covering them with the same quantity of earth,

and observing to sow them in double rows where the situation is exposed. As has been said of peas, it is much better that the rows should run from north to south, that they may be duly exposed to light.

In the south, few cottages are without scarlet runners, trained in one or other of the above ways. On the Continent, they mix the red with the white, which has a very pretty appearance. The crop is very profitable, and if sown in May or June, will continue to bear till killed by the frost. Abundance of seed may usually be obtained for a small garden, from those which chance to be left till too old for boiling; but leaving pods to ripen, diminishes the after crops of young pods. On the Continent, they cook the ripe beans without the pods, but these are not commonly used in Britain. Snails and slugs must be carefully guarded against when the plants are young. The best way is to search for them very early in the morning, and likewise to scatter quick-lime over the ground.

II. ON REARING COMMON FRUITS.

All fruits, in such quantities at least as they can be produced in small gardens, may be considered more as luxuries than as affording much nutrimental food; but most of them, when ripe, and still more when cooked in pies, puddings, tarts, jams, jellies, and other preserves, are wholesome, and form a pleasant variety at the tables even of the humblest cottager.

It will not be profitable in a small garden to have many fruit trees, even of the smaller kinds, as they tend so much to injure the more important crops by shading them from the light. We shall therefore give only such directions here as appear to be suitable for cottage gardens, beginning with the smaller sorts.

1.—*Strawberries.*

Strawberries contain a little sugar, a good deal of pulpy fibre, and a mild agreeable acid, and are exceedingly wholesome, being one of the few fruits which almost any one may eat with impunity, and ripening at a healthy season of the year.

The soil best adapted for them is a strong rich loam, and one that is tolerably adhesive and retentive of moisture ; for, as strawberries are generally injured in this country by excessive drought, it is best to provide against this calamity by planting them in a rather wet soil. A rich soil, however, is not indispensable, as almost any mould that is not too dry, will produce a greater or less quantity of fruit.

Trenching the ground a foot and a half deep, and mixing plenty of well-rotted dung with the soil that is brought to the surface, is the best preparation.

The time of planting is the first week in August for the offsets of the first spring runners, always choosing those that are large, and rejecting small ones. During the first year, cut off all runners as they appear. Any time from October to May will do for planting out old stools which have borne fruit once. Those which have borne twice are good for nothing, and should be thrown away.

The offsets may be planted in a single row along the borders of the walks, at ten or fifteen inches apart ; if another row be made, it ought to be fifteen inches from the other. They may also be planted in clumps of three or more together, six inches or less apart, and three feet between the clumps. Beds with four rows each, and two feet between the beds for cabbages, answer well. But the best situation for planting strawberries is, where a row of dwarf apple, pear, or other trees, is grown on either or both sides of a walk, to have a bed of strawberries, four or five feet wide beneath them ; for in this situation they will be afforded that degree of shade which is necessary for them in dry weather, without injuring the trees or being injured by them. In these beds they should first be planted in four rows, two on each side of the trees, and the offsets from these should be allowed to spread so as to extend themselves over the whole of the bed, only cutting off annually those that are disposed to wander from the prescribed bounds of the bed. A strawberry-bed of this description would produce a far greater crop than if planted out in single rows, and will continue bearing for a greater number of years, as well as be less liable to injury from drought.

It is important to fix the roots well in the ground, other-

wise they may be drawn out by earthworms, or pushed out of the ground on a thaw succeeding a hard frost.

The best sort is Keen's seedling, and next to that the old pine, Wilmot's superb, the Roseberry, and the Hautbois, or Hoboy ; the scarlet is the earliest ; and the small red Alpine, which some say is best when raised from seed, others say best from runners, planted in August or September, at six inches distance, will produce fruit from the end of May till the frost sets in. For a late crop, all the flower-stems should be cut off as they show, up to the end of June. The Alpine is not the wild or wood strawberry, as is commonly supposed. The Elton, the British Queen, and the Prince Albert, are also very good sorts, the two latter being particularly large.

Strawberries are much injured by hot dry weather, and therefore they must be abundantly supplied with water when this occurs, particularly just as the blossom falls ; but the blossom must not be wetted. Weeds must be cleared off, but in stirring the earth with a fork, not with a spade, care must be taken not to go too near the roots, as recommended by some. Birds must be guarded against, as well as snails and slugs, which would eat the blooms and spoil the fruit. Pieces of slate, tiles, tin, boards, or, what is preferable, hay, straw, or dry moss, should be laid three or four inches thick under the fruit as it becomes ripe, to keep it clean from sand ; but this precaution is seldom necessary. The superfluous runners and dead leaves should be removed in February or March. It is a bad plan to cut off the leaves in autumn. What are termed male or barren plants, should always be grubbed up.

Very large Strawberries are obtained by placing the plants singly, two feet apart, or in groups of three, the same distance between the groups, and keeping the runners cut off, and removing some of the blooms. Strawberries succeed better if removed or re-planted every three years, and they should have a dressing of fresh soil and decayed manure each spring. On ground that slopes to the south, or raised banks, they will ripen earlier. And it is a good plan to plant them on small banks, covered with flat bricks, leaving openings for the plants, as they ripen sooner, and are kept cleaner by this method.

2.—*Raspberries.*

This is perhaps superior in flavour to the strawberry, though not on the whole so palatable ; but it is nevertheless good and very wholesome.

It will grow in almost any soil, but requires rich earth and good manure to make it bear well, and the ground must be well and deeply dug or trenched before planting. The best time for planting is October, and though many individuals recommend February and March, we have more than once spoiled a crop by following their advice.

From three to five offsets or suckers may be planted in a clump, taking care not to let the roots dry in the sun before planting, and the clumps should be from four to six feet asunder ; or in rows, east and west, four feet apart.

If fruit be not wanted the first year, it will assist in the formation of stronger and finer young suckers to cut the plants down to within six inches of the ground.

The best sorts are the Antwerp red and yellow, the next the cane ; but the sort which bears twice in the season is the most prolific. The wild sort is good for nothing.

As strawberry plants bear but two years, raspberries bear only one year. The stems which are done bearing should therefore be cleared away and kept for flower-sticks, and also the weaker young shoots, leaving about five of the strongest young stems, shortened to four or five feet, in a clump, to bear next season. They should be slightly bent towards the centre, and tied loosely with a small twig of willow round a stake, to prevent their being broken by the wind : they require moving into fresh soil every four years, on account of exhausting the ground.

3.—*Gooseberries.*

This excellent small fruit contains when ripe a good deal of sugar and pulpy fibre, flavoured chiefly with the malic acid. It is very wholesome and not unprofitable.

The gooseberry will grow on the poorest soil, even on the top of an old wall ; but for producing good crops, requires a rich deep soil, well and deeply dug, or trenched and manured before planting.

The best time for planting cuttings or slips is October ; but they will succeed if planted at any time between this and March, though those planted in October or November will produce the best plants, and will not be so liable to fail.

The cuttings must be made from the shoots of medium size, (not the root-suckers of the same year,) about a foot or more in length, cutting off the top, and all the buds but four, and making two or three shallow notches in the bark at the root end, to cause root-fibres to sprout. The cuttings should invariably be slipped from the tree, for, as has been previously observed, they will be more likely to form roots when thus treated. When longer cuttings cannot be procured, six or even three inches, leaving only one or two buds, will be sufficient.

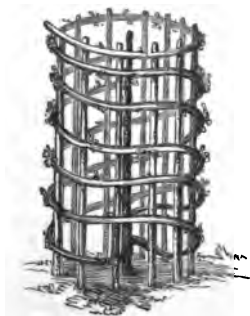
As old trees do not look nor bear so well as young ones, a few cuttings ought to be struck every year, to replace decayed or inferior stocks. The sorts are almost innumerable, and the Lancashire ones in particular, with drooping branches, are in general very large, such as Farmer's roaring-lion : but the smallest sorts, particularly the rough red, the smooth black, and the early green, are far superior in flavour. The champagne grows erect.

The cuttings may at first be planted a few inches apart, and after they are rooted, may be transplanted into a rich nursery bed, in rows two feet apart, and half that distance between the plants, taking care to prune off all suckers and shoots on the lower part of the stem, and leaving four shoots, cut back to six inches.

In the second year they may be finally planted out at six feet apart, cutting out all superfluous shoots, and leaving only two on each of the four leading ones, heading these down to six inches. There will now be eight shoots to form a head ; but future prunings must be conducted in a very different manner. After the tree is well formed, and has the requisite quantity of branches, the practice of shortening the principal shoots is not only unnecessary, but is extremely injudicious, except with such as are growing too vigorously, or are inclining downwards, or point towards the centre of the tree. In all other cases, the leading shoots should never be stopped, for every cultivator knows that gooseberry trees have a great tendency to pro-

duce young and useless shoots, and of course any thing which promotes or increases that tendency, proves injurious to the tree, and prevents it from bearing so well as it otherwise would. In cutting out the superfluous shoots, they should invariably be taken off as closely as possible to the old ones, or may even be slipped out, if this operation is performed carefully, for the numerous buds which are placed at the bottom of each shoot will only produce more young shoots if left.

Gooseberries are apt to be seriously injured by the caterpillars of a saw-fly, which lays its eggs in rows along the under ribs of the leaves, and the caterpillars, after devouring the leaves, go into the ground, where they live in the pupa state till the following season. The most effectual remedy, is carefully looking over the bushes once a week, to watch the hatching of the eggs, when the few leaves infected may be picked off. Liquid manure from the stable or the privy, poured about the roots, is said to kill the pupae in winter, and at all events will do some good as manure if it do not kill them.



Method of Spiral and Funnel Training.

The trees may be trained in the form of a fan or of an espalier hedge, if desired, or in single stems, with spurs

only and no branches, to long stakes ; or, what is more usual, somewhat in form of a funnel, by cutting out the centre branches to admit light. When the fruit is to be gathered green, the thicker the bush and the more numerous the shoots the better ; but when it is intended for ripening, the centre of the bush should always be left open to admit light and air.

In the same way, by means of stakes to tie the shoots to, trees may be trained in form of a funnel or of a fan ; but none of these modes of training are equal to that of allowing the tree to form a uniform and compact bush, nor will so much fruit be produced by any other method as by that last mentioned. It will be important to dig around the trees, and point in occasionally some well rotted manure.

When the trees are old, the new shoots will be very short, and when the fruit spurs have borne for two or three years, they ought to be thinned out. For prize gooseberries, only one berry on a shoot is left to ripen.

4.—*Black Currants.*

Black currants are chiefly used for making jelly—useful in cases of sore throat, and also as a wholesome luxury.

The cultivation is precisely the same as that of the gooseberry, except that black currant trees require less pruning, as they do not produce such an abundance of young shoots. All dead or unproductive wood should be cut out every winter, and the shoots thinned, so as not to crowd each other, and to admit light, but very rarely shortened.

The trees grow high and straggling, and, from requiring much room, are not very convenient in small gardens, except in out corners, or trained to walls or palings ; but even in this case they are not profitable. The Naples sort is by far the best for produce and flavour. Black currant trees are extremely liable to be infested with aphides, and if the leaves on which they appear are not promptly sprinkled with tobacco water, they will entirely strip the trees of their leaves, and do great injury.

5.—*Red and White Currants.*

These fruits, particularly the red, contain less sugar and more malic acid than gooseberries; but, with a little sugar added, are palatable and wholesome, either cooked or uncooked.

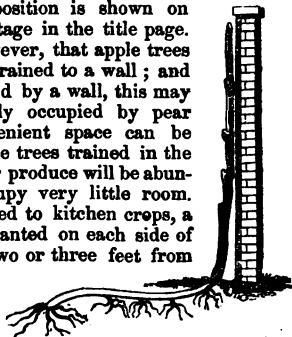
The white Dutch with yellowish fruit, and the white crystal, are the best. The red, though smaller, is very productive and profitable.

Red and white currant trees must be pruned in a very different manner to that recommended for gooseberries, and after they have produced the required number of branches, so as to form a uniform bush, the greater part of the young shoots must be annually taken off, leaving only the leading ones, and such as are desired to make new branches, and shortening these to four or six inches according to their strength, always cutting them off just above a bud that points outwards; for if this latter particular is not attended to, the points of the shoots will decay down to the bud, and have a very unsightly appearance, or the new shoots will grow inwards, and crowd up the centre of the plant. In pruning off the superfluous lateral shoots, they should not be cut off close to the old wood, but a short spur of about a quarter or half an inch in length should be left to each, as these spurs generally produce an abundance of fruit. It is always important to cut out old mossy wood, to have all the shoots open to the light, and to thin out the spurs when old or crowded.

In managing the cuttings, proceed as directed for gooseberries, except that they must not be slipped off, planting out in the second year when the plants have eight inches of stem, and about five leading shoots. Both these and black currants are greatly injured by having the flower-buds eaten off by sparrows, bullfinches, and other small birds, which must be carefully scared away. Much harm is also done by aphides and the leaf-rolling caterpillars of small moths. The best remedy is timely picking off the infected leaves, if it have been neglected in winter to scrape off the little grey patches of eggs, which are glued to the bark of the stem and branches. Whole branches are sometimes killed by the caterpillar of a moth eating into the wood.

6.—*Apple Trees.*

Apple trees of large size are quite unfit for the small gardens treated of in this book, except at the out corners, or as wall trees ; but a few dwarf standards, about twice the size of a gooseberry bush, may be admitted ; or one or two trained as espaliers, that is, in form of a hedge. When planted as wall trees, the farther the roots can be conveniently put from the wall the better, as is shown in the following figure, while the mode of training the branches in a hanging position is shown on the gable wall of the cottage in the title page. It may be observed, however, that apple trees seldom bear well when trained to a wall ; and where a garden is bounded by a wall, this may be much more profitably occupied by pear trees. Where a convenient space can be devoted to a row of apple trees trained in the manner of espaliers, their produce will be abundant, and they will occupy very little room. But if, in the part devoted to kitchen crops, a row of apple trees is planted on each side of the walk, and at about two or three feet from the verge of the walk, with a bed of strawberries or parsley beneath them, they will produce a very profitable and useful crop.



The most productive sorts are the Hawthorndean for summer use, and the Court of Wick for autumn and winter ; codlins are certainly good, but they are too straggling and vigorous in their growth for small gardens, and there is none so well adapted for this purpose, or so profitable, as the Hawthorndean. The trees must be procured from a nursery ready grafted, where they may generally be obtained at from two to four shillings each ; or a practised gardener may be requested to graft any required number of crab stocks, or, what is much better, French paradise stocks, which latter will check any exuberance in the growth of the graft, and render it more fruitful. This

operation, as before remarked, cannot be properly taught by the most detailed directions, without personal instruction and practical illustration by a gardener.

Having procured the trees, they should be planted out in the border before recommended, at about six feet from each other, in the months of October or November, never delaying this operation till the spring, otherwise their succeeding year's growth is often materially checked. A good quantity of manure should be mingled with the soil in the holes prepared for their reception, and the roots should be carefully laid out and covered, only treading the soil very slightly about them. At the time of planting they should not be pruned, nor during the whole of the first season; but in the succeeding winter the whole of the shoots should be cut down to within six inches or a foot of the stem, according to their size and strength, and the tree will thus form a bushy head in the ensuing season. Some recommend an annual pruning, in order to keep the trees dwarf, and promote the formation of fruit-bearing spurs; but, for the former purpose, this operation is quite unnecessary with the Hawthorndean sort, except with the very luxuriant shoots, as it has a natural tendency to grow dwarf, if headed down in the earlier stages of its growth; and, as to the latter object, it is extremely doubtful whether pruning will produce the desired effect;—all the pruning therefore that is necessary after the second year, is to clear out the old decayed wood, and keep the shoots sufficiently thin to admit light and air, and prevent them from rubbing against each other when blown by the wind. Standards should never be admitted into small gardens, as they shade the ground much more than dwarfs, and are more liable to have their crop blown off by the wind.

Espaliers should first be trained to one central shoot, and this must be constantly headed down till it produces the required number of lateral shoots, which may be spread out in a horizontal direction. These lateral shoots should never be stopped till they have attained the desired length, when the end should be cut off, which will induce them to throw out other laterals and fruit spurs. All the after pruning that they will require, is to shorten the laterals of

the latter description to one or two inches each year, thereby ultimately forming them into fruit spurs.

After the trees which have been planted out in the borders and treated as dwarfs have borne fruit for seven or more years, if they evince any signs of decay, or cease bearing so profusely as formerly, some young trees should be procured, and one of them planted between every two of the old ones, and when these young trees commence bearing, the old ones may be removed and thrown away; thus keeping up a constant succession of good bearing trees.

7.—*Pear, Plum, and Cherry Trees.*

Nearly the same remarks will apply to these as to apple trees, with the exception that plum and cherry trees will not do well as espaliers or dwarfs, but bear best when trained against a wall, or treated as standards. They are extremely unprofitable in small gardens, and should never be cultivated in them except as mere luxuries. A few pear trees might likewise be treated as dwarfs, where desired, but in this case they would require annual pruning.

The best and most prolific pears are, for a tall tree, the swan's egg, which will not bear much pruning; the Jargonelle and Marie Louise for walls; and the Marie Louise, Easter Beurré, and the Glout Morceau for dwarf pruned border plants. A few damson or bullace trees along the edge of a garden will not occupy much space, and are generally good bearers. The Morello cherry is useful on a north wall, being an abundant fruiter, and requiring little light. The Bigareau cherry is the finest, where a sunny aspect can be afforded. A Jargonelle pear tree is perhaps the best fruit tree which can be had for covering the end of a house which has either a good or an indifferent aspect. It may be managed as directed for espaliers, or trained in a fan form, and the shoots occasionally stopped to throw it into a spur-bearing state, pruning back all the side shoots every year, to induce the development of fruit spurs.

8.—*Grape Vines.*

In the climate of London, or anywhere south or not much north of it, grape vines may supply an agreeable luxury or a profitable crop, where they can be trained on the wall of a dwelling or other erection, and have an aspect between south-east and south-west. Although a little uncertain in their ripening, on account of the variations in our climate, they will seldom fail if properly treated, and the hardiest sorts chosen.

The black cluster and the white sweet-water are the only two kinds that can thoroughly be depended on ; the black Hamburg, though a finer and better variety, ripening its crops comparatively seldom.

Grape vines should be planted on a raised border that has been well drained, and is, in fact, coated with brick or stone rubbish, or rough gravel, at the bottom. It should not be more than two feet or two feet six inches deep ; as grapes ripen much better when the vines are grown on a rather shallow border. The soil should be composed of good turfy loam, rotten dung, and chalk if it can be had, in the proportions of one-half loam, two-sixths manure, and one-sixth chalk, which should be well mixed, and laid with a slope outwards from the wall. The vines may be planted in November. If, by chance, a path runs along the front of a house, and traverses the vine border, it should be paved, and used as little as possible for a few years, as much direct trampling would spoil the border.

Grape vines should be planted young,—when not more than two or three years old,—in the month of November. They may be trained horizontally from a single upright stem, or two branches may be trained horizontally, in opposite directions, towards the bottom of the wall, to the length of two or three yards each, and then turned up the wall, filling in the middle space with lateral shoots from these, trained upright. The pruning of the grape vine should be partly performed during the growing season, when it will require stopping and training, at least twice in the summer ; but principally in November, when it

should be cut pretty severely. It had better be done by an experienced gardener, as written directions will be but an insufficient guide.

It is a bad plan to leave too many bunches of grapes on a vine, as they will seldom ripen so well when very numerous. The leaves should never be plucked off around the fruit. Muslin bags will be useful when the grapes are getting ripe, to preserve them from wasps and other insects; but the muslin ought to be very thin. A light coloured wall will be less fitted for ripening grapes than a dark one.

III.—ON REARING FLOWERS.

Flowers, though not a necessary of life, add much to innocent pleasure, and their cultivation is a healthful employment, which most people like, and by which all may be improved. "Solomon in all his glory," says our Saviour, "was not arrayed like one of these."

Within the last few years, a taste for the cultivation of these interesting and beautiful productions of nature has been so rapidly diffused, that it has now become almost universal, and the poorest peasant, who can scarcely find means to supply himself and his family with the common necessities of life, nevertheless prides himself in having at least a few choice flowers, and experiences a degree of delight in cultivating them and watching their progress, which is almost unknown in the higher ranks of society, or amongst those individuals who possess and employ the means which are afforded them for collecting together the floral beauties of all parts of the world. To meet the wants and wishes of this large class of society, as well as to afford directions by which every person, who has neither the necessity nor the means for employing a gardener, may cultivate in perfection all descriptions of flowering plants which do not require any artificial structure to protect them, except such as every person possesses,—a dwelling-room,—is the object of the few succeeding remarks.

The chief principles upon which the successful rearing of flowers depends, are, not to gorge them with rich or watery food, which will produce leaves rather than flowers;

and to give them as much light as possible till half-blown, and as little as possible after :—the only way to bring out the colours, which depend on oxygen gas obtained from the air, and to keep them from fading by losing their oxygen gas when it has been produced.

These principles, however, though generally applicable, are by no means universally so ; and it would be as obviously inconsistent to prescribe general rules for the cultivation of flowering or other plants, as it would to say that all descriptions of animals require one and the same quantity and quality of food. In both cases, it is well known, that the objects vary as much in the measure and description of food they respectively require, as they do in size, shape, or appearance ; and without some general or particular knowledge of their peculiar constitutions or habits, they cannot be kept alive, much less in a healthy condition. Animals, however, being furnished with instinct or reason, can reject any food which would be pernicious to them ; but plants, having no such faculties, when subjected to any improper treatment, invariably perish if that treatment is persevered in ; so that it is of much greater importance that their nature should be fully understood, and their habits accurately ascertained. It is very interesting and beautiful to observe their power of adapting themselves to circumstances ; but this power has certain limits, beyond which it utterly fails.

Some flowering plants require a highly nutritive soil, others again succeed best in an extremely poor one ; many grow and flourish in great perfection in a very dry or sandy soil, while for some a damp, adhesive, and retentive soil is necessary ; a few seem to delight in a shaded situation, still the majority produce a greater abundance of fine flowers when they are fully exposed to light ; a slight protection is necessary for many in the winter months, but others endure severe frosts with perfect impunity. Under these circumstances, a few vague and general directions would, at best, be futile and useless ; and to enter minutely into the subject, would occupy more room than a work of this size and price would allow : therefore, it has been considered best to pass lightly over the less valuable sorts, and those which require only the ordinary system of management, and to dwell more

particularly on the most showy kinds, or such as are more difficult to cultivate, or, at least, require a departure from the usual course. In the following arrangement, then, some general directions will be given for cultivating all the most ornamental plants which can be procured or managed by individuals of limited means, and a few choice lists will also be furnished of such as are most worthy of attention.

1.—*Hardy Flowering Shrubs.*

The large class of plants which come under the denomination of flowering shrubs, and which all possess some degree of ornament or beauty, are extremely dissimilar with regard to size ; and, as many of them grow to ten or even twenty feet high, the larger sorts are by no means adapted for small gardens, and can only be grown where the garden is bounded by shrubberies, or where it is large enough to admit of the introduction of a clump or border of shrubs of such a size and height as those above mentioned. There are many, however, which may with propriety be placed in the centre of a detached clump, or at the back of a border, and in such situations, if the remaining portion of the bed or border is judiciously planted, no part of them will be seen but the foliage and flowers, and they will thus form an extremely interesting and ornamental feature in the garden.

As the plants of this description are as dissimilar in habit as they are in size, it will be convenient to arrange them in three divisions, and offer a few desultory remarks upon the cultivation of such as can be admitted into gardens of limited extent. Flowering shrubs naturally divide themselves into evergreen shrubs, or such as are constantly furnished with leaves ; deciduous shrubs, or those which annually shed their leaves ; and climbing shrubs, or such as require to be trained to poles, lattices, or walls.

Evergreen flowering shrubs, in which term is comprehended a large and important part of the first principal division of this subject, are perhaps the most beautiful and ornamental of all flowering shrubs, as they not only enliven the garden in the summer months with their beautiful

blossoms, but, by the constant verdure of their foliage, throw a charm over the winter scene, when all nature around appears desolate and inanimate. These, therefore, should be cultivated in preference to any deciduous flowering shrubs, as it is important, in a small garden, to grow only such plants as will afford the greatest variety of ornamental objects at all seasons of the year.

The larger kinds, such as common laurels, Portugal laurels, hollies, sweet bays, arbutus or strawberry tree, box, and others, though all of them exceedingly ornamental, are too large to be numerous admitted into small gardens, except their growth be constantly checked by annual pruning. Still, the dwarf kinds of hollies, the strawberry tree, and the box, and, in warm districts, the sweet bay, generally grow sufficiently small for gardens of moderate size, while the Portugal laurel and the common hollies may be pruned into any form according to taste, as also may the box or yew; but the common laurel generally grows too straggling to be worthy of introduction into small shrubberies. All these may be propagated with facility by layers, and will thrive in almost any soil, provided it is not too dry; a moderately stiff loamy soil being most suitable.

In planting out evergreens, it is important that this operation should be performed in the winter months, (from September to November is the best time,) and that particular care should be taken not to injure the root fibres in removing them, as well as to take them up with as much earth as possible about the roots. By attention to these particulars, and choosing a dull and cloudy day for planting them, they may be removed with safety, even though they should be twenty feet in height; but small plants will undoubtedly succeed best. If the numerous interesting species of pine, fir, and cypress, may be allowed a place in the garden, the two former can only be multiplied either by seeds or inarching, and as the latter is by far the most expeditious method, it must be performed by an experienced gardener, and the plants so treated will need shading till they have become firmly united. In other respects, they require precisely the same treatment as those before mentioned.

The species of evergreens yet noticed, are chiefly remarkable for the beauty of their foliage and general appearance; but there is a much greater and far more interesting portion, which are cultivated for the conspicuous appearance of their flowers as well as foliage, and whose dwarf habits render them available to the smallest gardens. To these, therefore, it will be necessary to devote particular attention, and to enter more minutely into the subject of their cultivation. Before, however, any remarks are made on this subject, it will be well to give a short list of such as are most beautiful, and may be most readily procured, arranging them according to the time of flowering and the height, so that a succession of flowers may be constantly maintained, by selecting the plants according to the following list.

SELECT LIST OF EVERGREEN FLOWERING SHRUBS.

From six inches to two feet high, and upwards.

- Greater Periwinkle (*Vinca major*). Flowers in March. Blue.
 Lesser Periwinkle (*V. minor*). Fl. in March. Violet-coloured.
 Lesser White Periwinkle (*V. minor, alba*). Fl. in March. White.
 Lesser Double Periwinkle (*V. minor, plena*). Fl. in March. Blue.
 Bastard Box (*Polygala chamæbuxus*). Fl. in March. Yellow.
 Common Heath and varieties (*Erica vulgaris, et var.*). Fl. in March.
 Various colours.
 Flesh-coloured Heath (*Erica carnea*). Fl. in March. Pink.
 Marsh Labrador Tea (*Ledum palustre*). Fl. in April. White.
 Box-leaved Ammyrsine (*Ammyrsine buxifolia*). Fl. in April. White.
 Garland-flower (*Daphne cneorum*). Fl. in April. Pink.
 Small-calyxed Andromeda (*Andromeda calyculata*). Fl. in April.
 White.
 Evergreen Candy-tuft (*Iberis sempervirens*). Fl. in April. White.
 Trailing Chamæledon (*Chamæledon procumbens*). Fl. in April. Pink.
 Purple Rock Rose (*Cistus purpureus*). Fl. in May. Purple.
 Marum-leaved Sun Rose (*Helianthemum marifolium*). Fl. in May.
 Yellow.
 Common Sun Rose (*H. vulgare*). Fl. in May. Yellow.
 Polium-leaved Sun Rose (*H. polifolium*). Fl. in May. White.
 Creeping Mahonia (*Mahonia repens*). Fl. in May. Yellow.
 English Petty Whin (*Genista Anglica*). Fl. in May. Yellow.
 Wood Genista (*G. sylvestris*). Fl. in May. Yellow.
 Polium-leaved Menziesia (*Menziesia polifolia*). Fl. in June. Purple.
 Blue Menziesia (*M. cærulea*). Fl. in June. Blue.
 Tetrailx (*Erica tetralix*). Fl. in June. Flesh-coloured.

- White Tetralix (*E. tetralix, alba*). Fl. in June. White.
 Grey Heath (*E. cinerea*). Fl. in June. Purple.
 Polium-leaved Andromeda (*Andromeda polifolia*). Fl. in June. Pink.
 Spotted Sun Rose (*Helianthemum guttatum*). Fl. in June. Yellow.
 Ledum-leaved Sun Rose (*H. ledifolium*). Fl. in June. Yellow.
 Spiny Broom (*Cytisus spinosus*). Fl. in June. Yellow.
 Prickly Butcher's Broom (*Ruscus aculeatus*). Fl. in July. Green.
 Large calyxed St. John's Wort (*Hypericum calycinum*). Fl. in July. Yellow.
 Hoary Rock Rose (*Cistus canescens*). Fl. in July. Red.
 Montpellier Rock Rose (*C. monspeliensis*). Fl. in July. White.
 Thick-leaved Andromeda (*Andromeda crassifolia*). Fl. in Aug. Pink.
 German Genista (*Genista Germanica*). Fl. in Aug. Yellow.
 Dwarf Polium-leaved Menziesia (*Menziesia polifolia, nana*). Fl. in Aug. Purple.
 Surrey Sun Rose (*Helianthemum Surrejanum*). Fl. in Sept. Yellow.
 Italian Sun Rose (*H. Italicum*). Fl. in September. Yellow.
 Strict Heath (*Erica stricta*). Fl. in September. Purple.
 Aloe-leaved Adam's Needle (*Yucca aloifolia*). Fl. in September. Greenish-white.
 Southern Heath (*Erica australis*). Fl. April to August. Pink.
 Narrow-leaved Cotoneaster (*Cotoneaster microphylla*). Fl. in June and July. White.
 Holly-leaved Mahonia (*Mahonia aquifolium*). Fl. in April and May. Yellow.
 Many-flowered Andromeda (*Andromeda floribunda*). Fl. in March and April. White.
 Catesby's Andromeda (*Andromeda Catesbaei*). Fl. in May and June. White.
 Hairy-leaved Rose-bay (*Rhododendron hirsutum*). Fl. in May and June. Crimson.
 Rusty-leaved Rose-bay (*Rhododendron ferrugineum*). Fl. in May and June. Crimson.
 Shallow Gaultheria (*Gaultheria Shallon*). Fl. in May. White.
 Lavender (*Lavandula spica*). Fl. in July and August. Blue.

From two to four feet high, and upwards.

- Laurestine (*Viburnum tinus*). Fl. in March. White.
 Hairy Laurestine (*V. tinus, hirta*). Fl. in March. White.
 Shining-leaved Viburnum (*V. lucidum*). Fl. in March. White.
 Spurge Laurel (*Daphne laureola*). Fl. in March. Green.
 Hill Daphne (*D. collina*). Fl. in March. Pink.
 Daurian Rhododendron (*Rhododendron dauricum*). Fl. in Mar. Purple.
 Mediterranean Heath (*Erica Mediterranea*). Fl. in April. Purple.
 Double European Furze (*Ulex Europæa, plena*). Fl. in April. Yellow.
 Spreading Genista (*Genista patens*). Fl. in April. Yellow.
 Rigid Lyonia (*Lyonia rigida*). Fl. in April. White.
 Whitened Andromeda (*Andromeda dealbata*). Fl. in April. Pink.
 Pontic Daphne (*Daphne pontica*). Fl. in April. Greenish yellow.

- Canadian Labrador Tea (*Ledum Canadense*). Fl. in May. White.
 Greenland Labrador Tea (*L. Greenlandia*). Fl. in May. White.
 Pontic Rhododendron and varieties (*Rhododendron ponticum*, et var.).
 Fl. in May. Various colours.
 Broad-leaved Kalmia (*Kalmia latifolia*). Fl. in May. Red.
 Narrow-leaved Kalmia and varieties (*K. angustifolia*, et var.). Fl. in
 May. Red.
 Pilose Green-weed (*Genista pilosa*). Fl. in June. Yellow.
 Dyer's Green-weed (*G. tinctoria*). Fl. in June. Yellow.
 Purple Phlomis (*Phlomis purpurea*). Fl. in June. Purple.
 Shrubby Jerusalem Sage (*P. fruticosus*). Fl. in June. Yellow.
 Montpellier Rock Rose (*Cistus monspeliensis*). Fl. in June. White.
 American Spindle Tree (*Euonymus Americanus*). Fl. in July. White.
 Round-leaved Rock Rose (*Cistus rotundifolius*). Fl. in July. Purple.
 Small-flowered Genista (*Genista parviflora*). Fl. in August. Yellow.
 Shining Privet (*Ligustrum lucidum*). Fl. in August. White.
 Irish Furze (*U. Hibernica*). Fl. in September. Yellow.
 Acuminate Adam's Needle (*Yucca acuminata*). Fl. in Sept. White.
 Ever-blowing Rose (*Rosa semperflorens*). Fl. all the year. Crimson.
 Oval-leaved Garrya (*Garrya elliptica*). Fl. in February and March.
 Greenish.
 Rosemary-leaved Grevillea (*Grevillea rosmarinifolia*). Fl. in April
 and May. Reddish green.
 Japan Aucuba (*Aucuba japonica*). Fl. in May and June. Chocolate.
 Gum Cistus (*Cistus ladaniferus*). Fl. in June and July. White, with
 brownish spots.
 Laurel-leaved Rock Rose (*Cistus laurifolius*). Fl. in June and July.
 White.
 Alaternus (*Rhamnus Alaternus*). Fl. in Feb. and March. Greenish.

Though occasionally a few plants of this description continue in flower through the three last months of the year, yet, as no dependence can be placed on them, we refrain from adding them to our list, and proceed to point out the prominent features that should be attended to in cultivating any and all of those just specified.

Rhododendrons, which may be termed with propriety the glory of our gardens, require a very peculiar kind of treatment in order to grow them to perfection; and as they are undoubtedly the most showy of all evergreen shrubs, and, being dwarf, are well adapted for the smallest gardens, it is important that the proper method of growing them should be generally known. The first and principal point to be attended to in their cultivation is, to plant them in pure peat or heath mould, and though a small addition of light loamy soil will not injure them, they will never thrive so well where planted in loam alone, or common

garden-soil. But, almost equal in importance to soil, is the situation in which they are planted ; for, where they are exposed to the full blaze of a spring or summer sun, the leaves become brown and sickly, and the whole plant frequently perishes from drought, even though water should be daily supplied ; for no artificial watering will preserve the plants during a dry season, in such a situation, except they be planted in a wet and clayey soil, which is equally as injurious as drought. A sheltered and shaded situation is, therefore, most suitable for rhododendrons ; and if this shelter and shade can be afforded by a wall or high hedge, it is far preferable to planting them under large trees. A border, which has a northern aspect, and is backed by a wall, is admirably adapted for this purpose ; and, though such a situation is by no means indispensable, yet the plants will be found to flourish better the more this particular is attended to.

Where they are unavoidably planted in an open, exposed plot of ground, it will be necessary to water them frequently in the spring and early part of the summer, if the weather is dry, otherwise their flower-buds will wither and never expand themselves : but if they are placed in the situation here recommended, this attention will be seldom necessary, as the soil, by being shaded, will be kept sufficiently moist.

These remarks are equally applicable to kalmias, andromedas, and all similar plants, which likewise require moist heath-soil and shade to grow and flower them in perfection. But there are others, such as heaths, menziesias, whortleberries, rock-roses, and sun-roses, which, instead of requiring shade, cannot be placed in too exposed a situation, as they grow naturally on open moors, or rocks, and seem to delight in receiving the most vigorous and scorching rays of the sun. These, also, with the exception of the two latter, grow best in a peat soil or bog earth ; but the rock-roses and sun-roses will thrive well in any poor soil that is not retentive of moisture, and if pieces of rock, soft stone, or chalk, are mingled with the soil, the plants will grow and flower much better. All the species of these latter genera are exceedingly ornamental, as they produce a great abundance of flowers of various colours, and are of very dwarf

habits, thus being suitable for the smallest gardens ; they are also readily procured, as many of them are natives of Britain.

The flesh-coloured Heath (*Erica carnea*) is a most elegant and interesting little shrub, since it blooms a good part of the winter, and far on into the spring. *Andromeda floribunda* blossoms at a similar season, and is extremely beautiful, but scarce. It requires a peaty soil. The hardy varieties of the scarlet or crimson rhododendron and the white flowered kinds are particularly valuable ; the former being so showy, and the latter blooming later than any of the others.

Laurestine, double furze, and genistas, likewise grow best in an exposed situation, and will thrive in any loamy soil ; the two former are sometimes injured by severe frosts, but they will generally sprout again from the roots, and should never be allowed to grow too large, for young plants will flower much better, and maintain a much more compact and healthy appearance than very large and old ones. The two former of these, especially, should never be absent from any garden, as they flower in most unbounded profusion. The various species of *Daphne*, which are all more or less beautiful, require a rather light loamy soil ; the spurge-laurel (*D. laureolus*) will thrive best under trees, or in a shaded situation ; but all the rest differ from it in this respect. The garland-flower, (*D. cneorum*,) which is justly said to be one of the most lovely and fragrant plants known in Britain, is rather difficult to cultivate, and requires to be planted in an airy, exposed situation, and in a soil composed of equal parts of light loam and peat ; it may be procured for a very trifling sum, and no garden should be without it, as it is very dwarf, produces a great number of clusters of pretty pink blossoms from April to September, and these are most delightfully fragrant.

The periwinkles will grow in almost any situation, and any soil that is not too dry, and they are admirably adapted for planting under trees and shrubs ; they readily multiply themselves by suckers. All the evergreen shrubs thus enumerated can be abundantly propagated by layers ; many produce naturally an abundance of suckers, which may be

removed in the autumnal months, and planted where required ; some few strike readily from cuttings, as the double furze ; and others ripen seed freely, such as rhododendrons and andromedas : but as by this latter method of propagation, the seedlings require great attention, and are some years before they produce flowers, it is not so generally available as that by layers. Where, however, new varieties of rhododendron are desired, the only way to obtain them is to impregnate the flower of one sort with the pollen of another, and sow the seed in a slight hot-bed as soon as it is ripe, pricking out the plants, and re-planting them when required.

Certain kinds of evergreens are particularly adapted for growing beneath the shade of trees and other plants. Of these, the common holly, the box, *Mahonia aquifolium*, common rhododendrons, privet, (which is nearly evergreen), *Hypericum calycinum*, (likewise almost evergreen), and common ivy are the best. In such positions, they will not only live but flourish, and cover the ground, which would otherwise look blank and bare, with a perpetually green mantle.

Some evergreens are further suitable for forming into hedge-rows ; for which purpose they will be more constantly effectual than deciduous plants. Hollies, box, yew, and privet are the chief of them ; and they will all bear hard pruning or clipping, though the two former require but little dressing.

The beautiful tribe which includes the Cypresses, Junipers, Arbor Vitæ, Irish Yew, &c., will be very effective in a garden if they can be admitted ; as their spiry forms and delicate branches form a striking contrast to the roundness and fulness of more ordinary shrubs. *Phillyrea latifolia* or *P. angustifolia* are likewise good and useful evergreens ; the foliage of the last being particularly graceful and of a very exotic appearance. If an open space can be spared, too, for the *Araucaria imbricata*, its singular and stately form will tell wonderfully in a small garden, especially on a little lawn. And it may now be purchased for a moderate sum.

Deciduous flowering shrubs are undoubtedly more numerous than those last treated of, but they are by no means

so ornamental, or at least they are only ornamental at certain seasons of the year, while evergreens retain their foliage, and consequently a great part of their beauty, throughout the whole of the year. Still there are many deciduous flowering shrubs which are extremely beautiful when in flower ; and out of the almost innumerable sorts, we shall now give a select list of those which are most ornamental, and which are suitable for small gardens, rejecting such as are not easily procured, or attain to too large a size.

SELECT LIST OF DECIDUOUS FLOWERING SHRUBS.

From six inches to two feet high.

- Parsley-leaved Yellow Root (*Xanthorrhiza apiifolia*). Fl. in April. Purple.
- Glaucous Kalmia (*Kalmia glauca*). Fl. in April. Red.
- Crenate-leaved Spiræa (*Spiræa crenata*). Fl. in April. White.
- Dwarf Cytisus (*Cytisus nanus*). Fl. in May. Yellow.
- White Persian Lilac (*Syringa Persica, alba*). Fl. in May. White.
- Common Dwarf Almond (*Amygdalus nana*). Fl. in May. Red.
- Dwarf Cherry (*Cerasus pumila*). Fl. in May. White.
- Beautiful Whortleberry (*Vaccinium venustum*). Fl. in June. Pink.
- Spiniest Scotch Rose and varieties (*Rosa spinosissima, et var.*). Fl. in June. Various colours.
- French Rose and varieties (*Rosa gallica, et var.*). Fl. in June. Various colours.
- Small-leaved Burgundy Rose (*Rosa parvifolia*). Fl. in June. Purple.
- Siberian Berberry (*Berberis Sibirica*). Fl. in June. Yellow.
- Hoary Spiræa (*Spiræa cana*). Fl. in June. White.
- Pretty Spiræa (*S. bella*). Fl. in July. Red.
- Kalm's St. John's Wort (*Hypericum Kalmianum*). Fl. in July. Yellow.
- Scentless Syringa (*Philadelphus inodorus*). Fl. in July. White.
- Dwarf Clethra (*Clethra nana*). Fl. in August. White.
- Garden Hydrangea (*Hydrangea hortensis*). Fl. in August. Pink.
- Corymbose Spiræa (*Spiræa corymbosa*). Fl. in August. White.
- Silver-leaved Cytisus (*Cytisus argenteus*). Fl. in August. Yellow.
- Autumnal Mezereon (*Daphne mezereum, autumnale*). Fl. in Sept. Red.
- American Ceanothus (*Ceanothus Americanus*). Fl. in Sept. White.

From two to four feet high, and upwards.

- Mezereon (*Daphne mezereum*). Fl. in February. Pink.
- Black Lonicera (*Lonicera nigra*). Fl. in March. Yellow.
- Japan Quince (*Cydonia Japonica*). Fl. in March. Scarlet.
- White Japan Quince (*C. Japonica alba*). Fl. in March. White.
- Siberian Almond (*Amygdalus Sibirica*). Fl. in March. Red.
- Japan Kerria (*Kerria Japonica*). Fl. in March. Yellow.
- Slender Syringa (*Philadelphus gracilis*). Fl. in March. White.
- Tartarian Lonicera (*Lonicera Tartarica*). Fl. in April. Pink.
- Smooth Spiræa (*Spiræa laevigata*). Fl. in April. Red.
- Common Cotoneaster (*Cotoneaster vulgaris*). Fl. in April. Pink.

- Blood-flowered Currant (*Ribes sanguineum*). Fl. in April. Red.
 Common Broom (*Cytisus scoparius*). Fl. in April. Yellow.
 White-flowered Common Broom (*C. scoparius, albus*). Fl. in April.
 White.
 Common Berberry and varieties (*Berberis vulgaris, et var.*). Fl. in
 April. Yellow.
 Common Lilac and varieties (*Syringa vulgaris, et var.*). Fl. in May.
 Various colours.
 Persian Lilac (*S. Persica*). Fl. in May. Purple.
 Double Dwarf Almond (*Amygdalus pumila*). Fl. in May. Red.
 Golden Currant (*Ribes aureum*). Fl. in May. Yellow.
 Azalea, many species and varieties (*Azalea spe. et var.*). Fl. in May.
 Various colours.
 Rusty Sweet Briar and varieties (*Rosa rubiginosa, et var.*). Fl. in
 May. Various colours.
 Wayfaring Tree (*Viburnum lantana*). Fl. in May. White.
 White Portugal Cytisus (*Cytisus albus*). Fl. in May. White.
 Fly Lonicera (*Lonicera Xylosteum*). Fl. in June. Yellow.
 Chinese Lilac (*Syringa Chinensis*). Fl. in June. Violet colour.
 Moss Rose and varieties (*Rosa muscosa, et var.*). Fl. in June.
 Various colours.
 Provence Rose and varieties (*R. centifolia, et var.*). Fl. in June.
 Various colours.
 Florid Allspice (*Calycanthus floridus*). Fl. in June. Brown.
 Guelder Rose (*Viburnum opulus*). Fl. in June. White.
 Round-headed Buddlea (*Buddlea globosa*). Fl. in June. Orange.
 Willow-leaved Spiræa (*Spiræa salicifolia*). Fl. in July. Pink.
 Viscous Azalea and varieties (*Azalea viscosa, et var.*). Fl. in July.
 Various colours.
 Shrubby Cinquefoil (*Potentilla fruticosa*). Fl. in July. Yellow.
 Elegant Sumach (*Rhus elegans*). Fl. in July. Red.
 Common Tree Bladder Senna. (*Colutea arborescens*). Fl. in July.
 Yellow.
 Sorbus-leaved Spiræa (*Spiræa sorbifolia*). Fl. in August. White.
 Smooth Sumach (*Rhus glabra*). Fl. in August. Greenish-yellow.
 French Tamarisk (*Tamarix gallica*). Fl. in August. Pink.
 Rush Broom (*Spartium junceum*). Fl. in August. Yellow.
 Syrian Hibiscus and varieties (*Hibiscus Syriacus et var.*). Fl. in
 August. Various colours.
 Tall St. John's Wort (*Hypericum elatum*). Fl. in August. Yellow.
 Woolly Spiræa (*Spiræa tomentosa*). Fl. in September. Pink.
 Many-flowered Cinquefoil (*Potentilla floribunda*). Fl. in Sept. Yellow.
 Alder-leaved Clethra (*Clethra alnifolia*). Fl. in Septemb. White.
 Indian Rose and varieties (*Rosa Indica et var.*). Fl. all the year.
 Various colours.

LOW DECIDUOUS TREES.

- Laburnum (*Cytisus Laburnum*). Fl. in June. Yellow. (Both
 English and Scotch varieties).
 Showy Pyrus (*Pyrus spectabilis*). Fl. in May. Pink.
 Snowy Mespilus (*Mespilus canadensis*). Fl. in May. White.
 Grape Pear (*Amelanchier botryapium*). Fl. in May. White.

- Blood-coloured Amelanchier (*Amelanchier sanguinea*). Fl. in June. White.
- Common Almond (*Amygdalus communis*). Fl. in April and May. Pink.
- Scarlet-flowering Hawthorn (*Crataegus oxyacantha*, var.) Fl. in May and June. Red.
- Pink-flowering Hawthorn (*Crataegus oxyacantha*, var.) Fl. in May and June. Pink.
- Double White Hawthorn (*Crataegus oxyacantha*, var.) Fl. in May and June. White.
- Double Pink Hawthorn (*Crataegus oxyacantha*, var.) Fl. in June. Pink.
- Double-blossomed Cherry (*Cerasus vulgaris*, *flore pleno*). Fl. in May and June. White.
- Red-flowered Horse Chestnut (*Pavia rubra*). Fl. in June. Red.
- Judas Tree (*Cercis siliquastrum*). Fl. in May. Pink.
- Common Syringa (*Philadelphus vulgaris*). Fl. in June. White.
- Rough Deutzia (*Deutzia scabra*). Fl. in June. White.
- Showy Leycesteria (*Leycesteria formosa*). Fl. June to September. White.
- Common Dogwood (*Cornus mas*). Fl. in June. White.
- Common Snowberry (*Symphoricarpos racemosus*). Fl. in July and August. Pinkish white.

Most deciduous flowering shrubs may be cultivated without the slightest difficulty, and on this account they recommend themselves to the notice of every person possessing a garden ; besides which, the majority of them will flourish in any common soil, and many will thrive well when shaded by other trees. In one respect their cultivation differs materially from that of evergreens, and that is, the greater part of them require an annual pruning. The various beautiful species of bladder-senna and rose are of this class, and many others derive much benefit from a slight pruning, which is also necessary to prevent them from becoming too large. As the species and varieties of rose are so very numerous, and all of them extremely beautiful, it may be well to advert more particularly to their cultivation and management.

The species and varieties of the rose being almost numberless, it is natural to suppose that some are very different in habit to others, and consequently require to be treated in a different manner. Thus, for instance, cabbage roses, China roses, and Scotch roses, each require a particular mode of management, and that which is given to one, is by no means suitable to either of the others. With regard to soil, however, it may be observed, that they all thrive best

in a rich loamy soil ; but, like potatoes, they are said to abstract the virtues of soils so rapidly, as to render it necessary to remove them every three or four years, in order to have fine flowers. This statement is certainly worthy of some attention, and being productive of no bad effects, it may possibly prove advantageous. Cabbage or Provence roses (*R. centifolia*), French roses (*R. gallica*), and moss roses (*R. muscosa*), require precisely the same kind of treatment, and whether they are kept as standards or dwarfs, must be annually pruned. They may be propagated in various ways, though for dwarf sorts, layering is the best method, and for standards, budding will be most successful. As the dwarf sorts usually produce an abundance of suckers, these may be made to form distinct plants by removing them in the autumnal months ; but, as has been before remarked, roses produced in this way never flower so early or so freely as those which have been raised from layers : therefore layering is much the best method. To the directions before given for layering roses, it may be added that the layered shoots should always be pruned down to a bud, and left about six inches out of the soil ; this pruning will cause them to form young shoots from each of the buds left, and by the end of the first year they will have attained to a sufficient size for removing. Standard roses may be obtained, by budding any esteemed sort on young stocks of the dog rose, or sweet briar, and these latter should be procured and planted in the required situation a year previous to the time of budding them, as by this practice they will have become well established in the soil, and the buds that are introduced will not be liable to injury from shifting the plant.

Pruning is by far the most important feature in the cultivation of the sorts of roses now under consideration ; for where this operation is neglected, the flowers will speedily degenerate into mere insignificance, and the stems will become bare and unsightly ; and, indeed, where these sorts of roses are but improperly or insufficiently pruned, a deterioration in the character of the flowers will invariably ensue. Many individuals, who are unacquainted with gardening, imagine, that by closely pruning their rose trees they would deprive them of the means of

producing flowers, and consequently that the plants thus treated will not flower so well ; but this is a vulgar error, at least so far as relates to the sorts now alluded to ; for, on the contrary, the more closely they are pruned, within certain limits, the greater number of finer flowers will be produced. In pruning roses, as in all other plants, the shoots must not be *uniformly* shortened to within a certain distance of the stem, but much consideration is necessary with regard to the size and strength of the shoots, and, with dwarf roses, the strong and vigorous shoots should be annually shortened to within six inches of their base, while the slender and weak shoots may be reduced to three or four inches ; young suckers that are not required for layering, should be pruned down to within six inches of the soil, and when these have attained to a good flowering state, the older parts of the bush may be cut out, as they will not flower so well after they have reached a certain age. By this means, also, there will be no necessity for removing them on account of their exhausting the soil, as the young suckers will be far enough from the old plant to prevent any injury from such a cause. Where the suckers become too numerous, they should be eradicated, as some kinds of roses will spread themselves over a large extent of ground, and not only become unsightly, but injure other plants.

Standard roses require to be still more closely pruned than the preceding, as it is desirable that they should form a uniform and compact head, so as to present a favourable appearance when viewed from any or all sides. The young shoots should be annually shortened to within two or three inches of the point they started from, and when the heads are found to become too large or straggling, some of the old wood should be cut out, and its place supplied with the young shoots which are continually springing from the centre of the head. By attention to these directions for pruning, standard roses may be made to form some of the most attractive features in the garden ; indeed, there are few objects which possess a greater claim to merit than a standard rose which has been judiciously pruned, and which, when in flower, has the appearance of a dense cluster of blossoms ; besides which, they occupy so little

room, that no garden should be destitute of them, at least where ornament is studied and desired. It is almost unnecessary to state, that they require supporting to stakes to preserve them from being beaten down by wind and rain, and that if any shoots are produced from the stem, or suckers from the roots, these should be timely destroyed. It must not be forgotten that these remarks, with regard to pruning both standard and dwarf roses, apply solely to the cabbage, and other sorts, before named. When climbing and China roses are budded on standards, they will of course require more liberal treatment as to pruning.

The China roses (*R. indica et semperflorens*) are so totally different in habit to those last treated of, that they require a brief notice. The sole difference, however, is with regard to pruning and propagation, the former of which they will not submit to, at least to any extent, and the latter may be performed from cuttings, which strike most readily if planted under a hand-glass. The cuttings may be taken off at almost any season, but the best time is early in the spring, before the shoots have commenced growing. This season is the most suitable, for two important reasons,—first, because, as these sorts of roses produce soft and pithy shoots, and as such shoots will seldom succeed well if treated as cuttings, they will always be of a firmer and more woody nature after having endured the severity of the winter; and, secondly, because, by being taken off in the spring, they will acquire sufficient strength during the summer to enable them to stand out in the ensuing winter without any protection. In selecting shoots for this purpose, the smallest and most woody ones should be chosen, provided they are of the previous year's growth, and they should be taken off as near the extremities as possible; if they can conveniently be slipped off, they will succeed much better. They should be planted in a warm border with a light soil, and covered with a hand-glass, which must be shaded during the heat of the day; water should be given them occasionally, but cautiously, as they will be much injured by any redundancy of it. In this situation they will soon form roots, and when the weather is favourable, they may be removed to the open border, where, if they are watered in dry weather, they will require no farther

attention, and will probably produce flowers in the autumn. With regard to pruning, it may be observed, that the shoots of China roses should never be shortened, except where they are too strong and vigorous ; for, like the shoots of most other shrubs which are of a soft pithy nature, those which are pruned generally die, at least at their extremities. But, after the shoots have flowered two or three years, they must be cut out, to make way for the young ones which are annually produced, as the young shoots always flower most abundantly.

Scotch roses (*R. spinosissima*) differ from both the descriptions of roses before named, and also require a peculiar mode of treatment. They thrive best in a moist loamy soil ; but it is an error to say that they delight in a shady situation, for they will not produce their flowers in perfection unless they are well exposed to light and air. Nothing, likewise, can be more erroneous than to state that they require extensive pruning, for, on the contrary, they should never be pruned, except the rank and luxuriant suckers, which may be annually slightly headed down, and all the other pruning that is requisite is to cut out the old and decayed wood. As they produce their flowers in almost unbounded profusion, they deserve to be more extensively cultivated in small gardens. They may be multiplied by suckers or layers.

The sweet briar, one of the most delicious of garden plants, will either do with or without pruning. But it is apt to become too rambling if some of the stronger shoots be not shortened. It makes a pretty but not a very perfect hedge.

Having thus briefly sketched out a few plain directions for cultivating one of the most beautiful and ornamental, as well as favourite, tribes of plants that can be admitted into small gardens, or indeed into any garden, it only remains to state that roses should be pruned about the month of March, and that all of them will thrive best in a cool moist soil, and will derive much benefit from an annual manuring of well-rotted dung. There are a variety of insects which infest roses, but, with the exception of the green fly, which may be destroyed by fumigating the plant with tobacco smoke, the best method of getting rid

of them is to pick off the leaves or flowers affected, and burn them.

There are few other deciduous flowering shrubs for which any peculiarity of treatment is necessary, but, as it has been remarked that many of them require pruning, it may be well to state the principal of those which will bear to be subjected to this operation. Lilacs, currants, and laburnums should never have their shoots shortened, but they may occasionally be thinned out with propriety, and all root-suckers should be annually removed, whether they are or are not required for propagation, as they are very injurious to the parent plant, and are likewise very unsightly. Guelder roses, syringas, Japan quince trees, and spiræas, will endure almost any degree of pruning, though the latter do not bear so much as the three former. The Japan kerria (usually called corchorus) must be treated precisely in the same manner as China roses in this respect; and the various species of cytisus, broom, and berberry, require no pruning, though the latter may be subjected to it if required. The tamarisk and bladder-senna must have their young shoots yearly shortened to eight or ten inches, otherwise they will grow too straggling. All the above may be propagated by layers or suckers, though the common broom can only be increased by seeds; many others likewise produce seeds, but these are generally a long time before they vegetate, and require much attention.

It has before been remarked, that most shrubs of this description will thrive in any common soil, but to this rule the numerous splendid species and varieties of azalea are exceptions, as they require a similar soil to rhododendrons, that is, a peaty soil; while the pretty mezereon, which is such a universal favourite, thrives best in a rather light and dry soil.

The short list of *low deciduous trees* which has now been appended includes some of the most beautiful of garden ornaments, and even the smallest place might always contain at least two or three of them. The hawthorn tribe, of which there are numerous other species and varieties, is especially pleasing. It will bear considerable pruning; but the plants look best when not subjected to any such treatment. None of these trees are particular as to soil.

They all, however, succeed best in a sunny and airy situation.

If still larger trees are desired in a garden, the lime is perhaps the most ornamental and suitable where only two or three large trees are wanted. Elms are fine old English plants, but spread their roots widely, and rob the soil very much. The ash has a similar fault, and comes into foliage very late in the spring. The acacia is extremely elegant, though liable to be broken by winds. Horse chestnuts are handsome. Their fruit and leaves have, however, a littery appearance. Lombardy poplars are execrable when standing alone or in rows; and common poplars and common willows are both coarse and poor in appearance. The beech is a noble tree, requiring plenty of room. Birch, especially the creeping kind, is both beautiful and suited for small gardens. The mountain ash and the service are both excellent. And the sycamore is admirable in the neighbourhood of the sea. Rare or peculiar trees, such as the purple beech, the variegated sycamore, the tulip tree, &c., are not in character with a very small place.

Drooping or weeping trees, being adapted for standing alone, and in the centre of a garden, recommend themselves for those of limited extent. The weeping ash, and elm, and lime, and the small-twigg'd weeping elm, and the weeping laburnum, and standards of cytissus, thornless acacia, Portugal laurel, rhododendron, cotoneaster, roses, weeping cherry, &c., form capital plants for the centre plot of a garden, and can be bought ready grafted at any good nursery.

Hedges for gardens may be composed of the common hawthorn, or privet, or holly, or box. The holly is best as an evergreen, but it is of slow growth. An excellent hedge may be formed of hawthorn and the more evergreen variety of privet, mixed in nearly equal proportions. These are fast growing, and the thorn will give strength, while the privet will impart some degree of greenness in summer. A single row of plants, placed about nine inches apart, will be sufficient. They should, after the first year, be kept neatly and vigorously clipped, keeping their sides in the shape of those of a slender cone. If left broad at the top, as is more customary, they will grow weak and thin at the

bottom. They should be clipped twice in the year,—in the middle of summer, just after they have perfected their growth, and in early winter.

Climbing flowering shrubs are an exceedingly interesting class of plants, though not numerous, and can only be cultivated where walls, fences, or other structures for training them to, are possessed. Still there is a method of training and supporting climbing plants which is within the reach of the poorest individual, and which produces a very ornamental and pleasing effect in a garden, and that is, to poles, of various heights and sizes, according to the strength of the plant which is trained to them. Indeed, this method is perfectly congenial to the natural habits of most climbing plants, as they generally twine themselves round the stems and branches of trees for support. Besides which, every individual possesses a dwelling-house of some description, to the walls of which some few climbing plants may be trained; and the numerous charms which a cottage is said to possess are at least greatly heightened, if not solely produced, by the elegant honeysuckle or the glowing rose, which hang in gay festoons of living beauty from its otherwise unsightly walls. A short list of the most beautiful climbing plants may therefore not be unacceptable here.

SELECT LIST OF CLIMBING FLOWERING SHRUBS.

Revolute-flowered Jasmine (*Jasminum revolutum*). Flowers in March. Yellow.

Japan Quince (*Cydonia Japonica*). Fl. in March. Scarlet.

White Japan Quince (*C. Japonica, alba*). Fl. in March. White.

Japan Kerria (*Kerria Japonica*). Fl. in March. Yellow.

Florid Virgin's Bower (*Clematis florida*). Fl. in April. White and Yellow.

Glaucous Virgin's Bower (*C. glauca*). Fl. in April. Yellow.

Blue Red-wood (*Ceanothus azureus*). Fl. in May. Blue.

Evergreen Thorn (*Cratægus pyracantha*). Fl. in May. White.

Italian Honeysuckle (*Caprifolium Italicum*). Fl. in May. Yellow.

Red Italian Honeysuckle (*C. Italicum rubrum*). Fl. in May. Red.

Etruscan Honeysuckle (*C. Etruscum*). Fl. in May. Orange.

Consequa's Wistaria (*Wistaria Consequana*). Fl. in May. Blue.

Banksian Rose (*Rosa Banksiæ*). Fl. in June. White.

Many-flowered Rose (*R. Multiflora*). Fl. in June. Pink.

Woodbine and varieties (*Caprifolium Periclymenum, et var.*) Fl. in June. Yellow and Red.

Traveller's Joy (*Clematis viorna*). Fl. in June. Purple.

Blue Passion Flower (*Passiflora cærulea*). Fl. in June. Blue and White.

- Ivy-like Ampelopsis (*Ampelopsis hederacea*). Fl. in June. Green.
 Russel's Rose (*Rosa Russelliana*). Fl. in July. Red.
 Ruga Rose (*Rosa Ruga*). Fl. in July. Blush-coloured.
 Vine-bower (*Clematis viticella*). Fl. in July. Purple.
 Double Vine-bower (*C. viticella, plena*). Fl. in July. Purple.
 Official Jasmine and varieties (*Jasminum officinale, et var.*) Fl. in July. White.
 Rooting Tecoma and varieties (*Tecoma radicans, et var.*) Fl. in July. Orange and Scarlet.
 Evergreen Honeysuckle (*Caprifolium sempervirens*). Fl. in July. Scarlet.
 Flame Virgin's Bower and varieties (*Clematis Flammula, et var.*) Fl. in August. White.
 Common Ivy and varieties (*Hedera helix*). Fl. in October. Green.
 Fragrant Chimonanthus and varieties (*Chimonanthus fragrans, et var.*) Fl. in December and February. Yellowish red.

There is something so peculiarly graceful and attractive in the appearance and habits of climbing plants, that, with every lover of nature, they are acknowledged favourites ; therefore a few general remarks on their culture will doubtless prove useful. Few persons seem to know and understand the proper management of these plants ; and, for this reason, they are usually seen either in a wild or slovenly state, or, what is almost as bad, are pruned too closely and trained too formally in the summer, and consequently produce few flowers. These remarks apply more particularly to the species of jasmine and virgin's-bower, which are all very beautiful and ornamental, but which are seldom seen neatly trained, and at the same time flowering in anything like perfection ; as these two desirable features very rarely accompany each other. To render this part of the subject more intelligible, it will be better to treat separately of such plants as are best adapted for training against a wall, and afterwards of those which show themselves to the greatest advantage when fastened to poles, or the stems of trees.

In training plants against a wall, it is necessary to consider whether they are merely intended for hiding the wall, or whether the beauty of their flowers is thus to be brought advantageously into view, and the wall rendered an object of ornament, instead of a dull and heavy feature in the scene. Where climbing plants are desired for the purpose of concealing an old and unsightly wall, no plant is so well adapted for this purpose as the common ivy, which,

by its constant verdure, will effectually answer the required design. But where the object is to exhibit the beauties of the plants thus trained, ivy should by no means be allowed a place, as it will extend itself too rapidly, and speedily occupy the whole of the wall. The more ornamental kinds must therefore be employed, and the following selection will be found to contain plants of the most varied colours, and all of them highly beautiful:—The Japan kerria, Japan quince, Etruscan honeysuckle, Banksian rose, China rose, officinal jasmine, and double vine-bower. These seven plants would form a most striking and pleasing variety, and may be very readily procured. The *Wistaria consequana* is unquestionably one of the most lovely plants that can possibly be obtained for training against a wall, but unfortunately the flowers begin to expand so early in the season, that it is extremely liable to injury from spring frosts, unless slightly protected. This is likewise the case with the blue red-wood, (*Ceanothus azureus*), which is also a most beautiful and ornamental object when in flower. If, however, they can be placed against a south wall which is not much exposed to wind, they will stand through the winter perfectly well, and both of them, the former especially, should be in the possession of every individual who can procure them. The evergreen thorn, or pyracanth, is grown chiefly for the beauty of the numerous clusters of red berries which it produces in the winter season, and is a very interesting and ornamental plant, as its green leaves and pretty red berries, being produced at the most gloomy season of the year, render it a valuable and welcome embellishment to any house or wall. The Virginian creeper, (*Ampelopsis hederacea*) is also much admired for the rich red tints which its leaves assume in the autumnal months, but, besides being a very free-growing plant, it possesses no other beauty. The *Tecoma radicans* is well adapted for training up the front of a house, and its rich trumpet-like flowers, which are produced very abundantly, render it an extremely beautiful object when in flower.

If a neat wooden trellis can be conveniently procured for placing against a wall to which climbing plants are intended to be trained, it will save the wall from being injured by

nails, and also have a very ornamental appearance. Strong strained wires, fastened either horizontally or vertically, about one-eighth of an inch from a wall, will be neater in appearance, and more durable. But, as few individuals with small means could go to such an expense, some general directions will now be given for training plants of this description against a wall. As has been before observed, cultivators greatly err in attempting to train their climbing plants in as formal a manner as if they were fruit trees ; for by this means they are deprived of the greater part of their flowers. With some kinds, however, this system is not only practicable, but it adds much to their beauty ; but this is only with such as produce few shoots, or are of very slow-growing habits. The wistaria, for instance, produces such straight shoots, that they may be trained in the most precise order, and indeed if they are not so trained, they will have a very unsightly appearance in the winter months. But, with the species of jasmine, and virgin's bower, which throw out such a vast number of lateral shoots, and in a very irregular manner, it is impossible to train them in anything like order, without depriving them of all the shoots which would produce flowers in the succeeding season.

When climbing plants are first planted against a wall, and until they have occupied the whole of the space they are intended to cover, it is important that they should be trained with all due regard to order ; but, after they have filled the space allotted to them, they will produce such an abundance of lateral shoots as to render it impossible to train them in a regular manner. At the time of planting, it should be determined whether they are to be trained in a perpendicular, horizontal, or spreading position, and this determination should afterwards be rigidly adhered to, otherwise nothing but confusion and disorder will ensue. Where the wall is high, the shoots should be trained perpendicularly, and also where it is low, with slow-growing sorts ; but with sorts of very rapid growth, such as the wistaria, it is necessary to train them in a horizontal direction.

In pruning climbing plants, due consideration is necessary with regard to the size and strength of the shoots, and the number of them ; for, in plants with weak shoots, and such as have not a sufficient number of them to cover the

wall, a close pruning is necessary in order to render them stronger, and the shoots more abundant. This point should especially be attended to while they are young, otherwise their lower stems will remain bare and unsightly—a very prevalent defect in plants of this description. The Japan quince, and the climbing rose, will seldom require their shoots shortening in this manner, and the Japan kerria, and the China roses especially, will not bear much pruning. The species of clematis and jasmine may be freely pruned in the winter, but they should never be deprived of their lateral shoots in the summer, as it is from the extremities of these that the flowers are generally produced; therefore, instead of cutting them off, the principal ones may be fastened to the wall, and the shorter ones allowed to protrude themselves from the wall; by which means their flowers will be exhibited to the greatest advantage.

When the plants have attained the required size, it is a good plan to prune the young laterals down to short spurs in the winter, and these spurs will produce more lateral shoots in the ensuing season, from the points of all which there will be a cluster of flowers. The system of spurring the young shoots in the winter, and of allowing them to take their own course in the summer, unless they become too straggling, is the chief point to be attended to in the cultivation of these plants, and if this is duly regarded, an abundant display of flowers will be ensured. Soil and aspect are of comparatively little importance, as a good rich loamy soil will be found suitable for all climbing plants, but it is important that they should have a border of such soil, full three feet wide, or, if practicable, four or five feet,—and that the soil should be well dug and prepared previous to placing the plants in it. A wall with a south or south-western aspect is certainly preferable for ornamental climbing plants, but this is by no means indispensable, as they will flourish in almost any situation, provided it is not too much exposed to cold winds; though they will certainly produce their flowers in greater perfection when they are well exposed to the sun, as they would be in the position first alluded to.

That climbing plants contribute much to enliven and embellish the walls of a cottage, every individual who has

visited a country village must be prepared to admit ; but the practice of training these plants to poles is so seldom adopted in small gardens, that few individuals are acquainted with the striking beauty of such objects when in flower, otherwise the system would be more generally practised. In cottage gardens, it would be difficult to imagine a more interesting feature, than two poles of climbing roses, placed one on each side of the entrance, in the small plot of ground which usually fronts the cottage ; and as they require very little attention, and the poles may be procured of any farmer for a trifling sum, it is really surprising that they are so universally neglected.

Besides training climbing plants to poles, it is an excellent plan, where shrubberies are possessed, to plant them at the base of the larger shrubs, and twine their shoots round the stems of the shrubs. This system is admirably adapted for honeysuckles and the species of virgin's bower, as well as for some kinds of roses ; and as they will not be injured by the shade of the shrubs, they will impart a degree of beauty to the shrubbery, which to be fully appreciated, must be seen, as it is beyond description. Climbing plants, trained to poles, (especially roses,) should never be pruned in the summer, as they produce their flowers from the extreme points of the shoots ; but, in the winter, they require a slight pruning to keep them within due bounds. The *Wistaria consequana* is an extremely beautiful object when trained to a pole ; but when treated in this manner, it should be most vigorously pruned, otherwise it will grow too straggling, and will not flower freely : by shortening its lateral shoots every season to three or four inches, it will produce a great abundance of flowers when trained in this manner.

In concluding these remarks on training climbing plants to poles, it is necessary to state that the height of the poles, and consequently of the plants trained to them, should be regulated entirely by the height of the cottage or dwelling to which they may be contiguous, as it must be clear to every one, that, if they are higher than the cottage, they will have a very unsightly and irregular appearance. Climbing roses seem to flourish best when planted in a stiff clayey soil, but all other climbing plants prefer a soil

of a lighter description, and, unless they grow too vigorously and luxuriantly, should have an occasional manuring.

2.—*Hardy Perennial Flowering Plants.*

Those plants are termed perennials, which produce flowers for an indefinite period of time, without being renewed by seed or otherwise. Thus, in this sense, shrubs and trees are perennials, though they are not usually called by that name, as their woody habits have obtained for them the distinct appellations of shrubs or trees. But perennials, in the common sense of the term, are such plants as not only produce flowers and leaves for an indefinite number of years, but the leaves and flowers and stems of which annually decay, to be reproduced in the succeeding season. This is undoubtedly the most extensive class of plants in the whole vegetable kingdom, and the objects comprised in it are no less beautiful than they are numerous, and abound in all parts of the world. Not a few of the most interesting species are found wild in the woods and meadows of this country, but because they are common, such is the prevailing desire for rarities, that they are generally denied a place in British gardens, while only the scarce and uncommon ones are cultivated, and such are supplied from foreign parts.

In the following selection, care has been taken to point out such and such only as possess the greatest claims to beauty, and at the same time are within the reach of all classes, omitting all those which are less worthy of attention, as well as all such as are usually termed "florists' flowers," in which are included the principal sorts of bulbs and tubers, and which will be made the subjects of future notice.

SELECT LIST OF HARDY PERENNIAL FLOWERING PLANTS.

From three inches to a foot high.

- Common Winter Aconite (*Eranthis hyemalis*). Flowers in Jan Yellow.
 Cos Cyclamen (*Cyclamen coum*). Fl. in January. Red.
 Common three-lobed Hepatica and varieties (*Hepatica triloba*, et var.). Fl. in February. Various colours.
 Whitish Wall Cress (*Arabis albida*). Fl. in February. White.
 Aizoon-like Draba (*Draba aizoides*). Fl. in February. Yellow.

- Spring Cyclamen (*Cyclamen vernum*). Fl. in March. Purple.
 Spring Venus's Navel Wort (*Omphalodes verna*). Fl. in Mar. Blue.
 Vernal Adonis (*Adonis vernalis*). Fl. in March. Yellow.
 Showy Enothera (*Enothera speciosa*). Fl. in March. White.
 Sweet-scented Violet and varieties (*Viola odorata, et var.*). Fl. in March. Various Colours.
 Stemless Gentian (*Gentiana acaulis*). Fl. in March. Blue.
 Alpine Wall Cress (*Arabis Alpina*). Fl. in March. White.
 Spring Bitter Vetch (*Orobis vernus*). Fl. in March. Purple.
 Perennial Daisy and varieties (*Bellis perennis, et var.*). Fl. in March. Various colours.
 Snowy Primrose (*Primula nivea*). Fl. in April. White.
 American Cowslip (*Dodecatheon media*). Fl. in April. Pink.
 Narrow-leaved Lungwort (*Pulmonaria angustifolia*). Fl. in April. Blue.
 Shady London Pride (*Saxifraga umbrosa*). Fl. in April. Pink.
 Double grain-rooted Saxifrage (*S. granulata plena*). Fl. in August. White.
 Pale Yellow Wallflower (*Cheiranthus ochroleucus*). Fl. in April. Yellow.
 Deltoid Aubrietia (*Aubrietia deltoidea*). Fl. in April. Purple.
 Rock Candy Tuft (*Iberis saxatilis*). Fl. in April. White.
 Official Lungwort (*Pulmonaria officinalis*). Fl. in May. Pink.
 American Globe Flower (*Trollius Americanus*). Fl. in May. Yellow.
 Saffroi-coloured Cinquefoil (*Potentilla crocea*). Fl. in May. Copper-coloured.
 Dwarf Enothera (*Enothera pumila*). Fl. in May. Yellow.
 Alpine Speedwell (*Veronica Alpina*). Fl. in May. Blue.
 Sweet-scented Woodroof (*Asperula odorata*). Fl. in May. White.
 Sea-side Thrift (*Armeria maritima*). Fl. in May. Pink.
 May Lily of the Valley (*Convallaria majalis*). Fl. in May. White.
 Rock Madwort (*Alyssum saxatile*). Fl. in May. Yellow.
 Pleasing Phlox (*Phlox amœna*). Fl. in June. Pink.
 Hybrid Avena (*Geum hybridum*). Fl. in June. Reddish-brown.
 Gypsophila (*Silene Gypsophila*). Fl. in June. White.
 Reflex-leaved Stonecrop (*Sedum reflexum*). Fl. in June. Yellow.
 Handsome Dielytra (*Dielytra formosa*). Fl. in June. Flesh-coloured.
 Hairy Bitter Vetch (*Orobis hirsutus*). Fl. in June. Red.
 Pennsylvanian Catchfly (*Silene Pennsylvanica*). Fl. in June. Red.
 Silver-leaved Star-wort (*Aster argenteus*). Fl. in June. Purple.
 Dwarf Starwort (*A. humilis*). Fl. in August. White.
 Double Ragged Robin (*Lychnis flos-ovuli, flore pleno*). Fl. in June and July. Pink.
 Stemless Gentian (*Gentiana acaulis*). Fl. March to May. Blue.
 Double white, red, and French white Primroses (*Primula vera, vars.*). Fl. in April and May.

From one to two feet high, and upwards.

- Winged Ammobium (*Ammobium alatum*). Fl. in March. White.
 Large-flowered Celandine (*Chelidonium grandiflorum*). Fl. in April. Yellow.
 Garden Wallflower and varieties (*Cheiranthus cheiri*). Fl. in April. Various colours.

- Yellow Corydalis (*Corydalis lutea*). Fl. in April. Yellow.
 Monk's Hood (*Aconitum napellus*). Fl. in May. Blue.
 Official Peony and varieties (*Peonia officinalis, et var.*). Fl. in May.
 Various colours.
 Dark Bloody Cinquefoil (*Potentilla atrosanguinea*). Fl. in May.
 Dark Brown.
 Snakeweed (*Polygonum bistortum*). Fl. in May. Pink.
 Yellow Asphodel (*Asphodelus luteus*). Fl. in May. Yellow.
 Red Valerian (*Valeriana rubra*). Fl. in May. Red.
 Common Columbine and varieties (*Aquilegia vulgaris, et var.*). Fl.
 in May. Various colours.
 Revived Honesty (*Lunaria rediviva*). Fl. in May. Purple.
 Matronly Rocket and varieties (*Hesperis matronalis, et var.*). Fl.
 in May. Various colours.
 Perennial Lupin (*Lupinus perennis*). Fl. in May. Blue.
 Large-flowered Larkspur (*Delphinium grandiflorum*). Fl. in June.
 Blue.
 Crown Lychnis and varieties (*Lychnis coronaria, et var.*). Fl. in
 June. Various colours.
 Sweet William (*Dianthus barbatus*). Fl. in June. Pink.
 Shrubby Oenothera (*Oenothera fruticosa*). Fl. in June. Reddish-
 white.
 Pyramidal Phlox (*Phlox pyramidalis*). Fl. in June. Pink.
 European Globe-flower (*Trollius Europæus*). Fl. in June. Yellow.
 Hairy Archangel (*Lamium hirsutum*). Fl. in June. Purple.
 Many-leaved Lupin (*Lupinus polyphyllus*). Fl. in June. Blue.
 Double-flowered Pellitory (*Pyrethrum parthenium, plena*). Fl. in
 June. White.
 Shining Lychnis (*Lychnis fulgens*). Fl. in July. Scarlet.
 Throatwort and varieties (*Campanula Trachelium, et var.*) Fl. in
 July. Various colours.
 Virginian Dragon's Head (*Dracocephalum Virginianum*). Fl. in
 July. Red.
 Early Starwort (*Aster præcox*). Fl. in July. Violet-coloured.
 Roseate Milfoil (*Achillea rosea*). Fl. in July. Red.
 Hairy Rudbeckia (*Rudbeckia hirta*). Fl. in July. Yellow.
 Dropwort and varieties (*Spiræa Filipendula, et var.*) Fl. in July.
 White.
 Panicle Phlox (*Phlox paniculata*). Fl. in August. Lilac.
 Virginian Spiderwort and varieties (*Tradescantia Virginica, et var.*)
 Fl. in August. Various colours.
 Wood Everlasting Pea (*Lathyrus sylvestris*). Fl. in August. Purple.
 Smooth Pentstemon (*Pentstemon lævigatus*). Fl. in August. Pink.
 Soft Bear's Breech (*Acanthus mollis*). Fl. in August. White.
 Varieties of Elegant Groundsel (*Senecio elegans, var.*) Fl. in Aug.
 Various colours.
 Many-leaved Starwort (*Aster polyphyllus*). Fl. in August. White.
 Common Golden Rod (*Solidago Virgaurea*). Fl. in August. Yellow.
 Woolly Milfoil (*Achillea tomentosa*). Fl. in August. Yellow.
 Slender-leaved Coreopsis (*Coreopsis tenuifolia*). Fl. in Aug. Yellow.
 Round-headed Globe Thistle (*Echinops Sphærocephalus*). Fl. in
 August. Blue.
 Spiked Liatris (*Liatris spicata*). Fl. in September. Purple.

Late-flowering Starwort (*Aster serotinus*). Fl. in September. Blue.
Many-flowered Sunflower and varieties (*Helianthus multiflorus*, et
var.) Fl. in September. Yellow.
Chinese Chrysanthemum and varieties (*Chrysanthemum Sinese*, et
var.) Fl. in October. Various colours.

It is presumed that the preceding list, though brief, will be found to contain as many plants as can be conveniently admitted into any garden of limited extent, and on this account it will be seen that many beautiful plants of this description which are difficult to procure, and others which are almost worthless, have been entirely omitted. We shall, therefore, now offer a few observations on their general culture.

The plants of this division are appropriately called by gardeners, "herbaceous plants," to distinguish them from other perennials of shrubby habits; and as they so closely resemble each other in their mode of growth, it will not be necessary to treat particularly of each individual plant or tribe, but merely to lay down a few general rules for cultivation, which will apply to the whole.

Perennials of this description may be multiplied in various ways; those which produce seed, such as wallflowers, primroses, columbines, pentstemon, &c., are very easily propagated, as they require no attention further than that of sowing the seed, and transplanting them when they have attained a sufficient size. Seeds of any of the kinds which produce them may be sown early in the spring, in beds or drills, in a light loamy soil, covering them with more or less earth according to their size: small seeds require a very shallow covering, and larger ones to be buried from half-an-inch to an inch in the soil. As soon as they have formed three or four leaves, they should be thinned to a sufficient distance from each other, and the thinnings, if taken up with care, may be transplanted elsewhere if desired. They should not be allowed to flower the first season, and in the succeeding spring they may be transplanted to the flower-borders, removing them with as much earth as possible attached to the roots.

As the double-flowered sorts rarely produce seed, these must be multiplied by dividing the roots; and many others which do ripen their seed, may be propagated

with much greater facility in this manner. The starworts, golden-rod, perennial lupins, and various others, will bear to be submitted to this operation, and, independently of this being a ready and certain method of propagation, it is absolutely necessary, to prevent the plants from spreading too rapidly, and occupying too large a space of ground. Where practicable, this is decidedly the best method of increasing plants of this description, as it occasions no extra trouble, and the plants, thus separated, produce their flowers the first season, which is seldom the case with seedlings. Where hand-glasses are possessed, and a little artificial heat is at command, many of these plants may be readily increased by cuttings, such as Chinese chrysanthemums and double rockets ; and by this method, the flowers will be rendered finer, or at least will be preserved from degenerating, which they frequently do when propagated by division of the roots. Chinese chrysanthemums may likewise be multiplied by layers, and sweet violets must be increased from offsets.

In practising any of these methods all the attention that is necessary is to allow the plants a sufficient quantity of water after transplanting, till they become properly established in the soil ; and in the case of cuttings, they must be duly shaded from the heat of the sun.

With regard to soil and situation, it may be observed that most perennials thrive best in a light and rather rich loamy soil ; but it should not be too rich, otherwise they will grow too strong, and produce but few flowers ; neither should it by any means be too poor or gravelly, or no part of the plant will grow to perfection. Perennials will grow well under the shade of shrubs or trees, but will certainly flower much finer and better if planted in an open exposed situation, and in such a one they should always be placed, if practicable ; though this is not essential to their existence, but only to their flowering in a superior manner.

In transplanting perennials, which may be done at almost any season, care should be taken to retain as much earth as possible about the roots, and when it is found necessary to remove them in the summer season, this should always be done in the evening of the day, and, if possible, in cloudy or showery weather : where this latter does not

occur, they should be liberally supplied with water each day, for some time after planting. Some writers recommend planting them in the autumnal months, but as by this practice they will be liable to be thrown out of the soil by severe frost, the spring is by far the best time for performing this operation. In planting those that shed their leaves, such as starworts, and others of similar habits, the crowns of the roots should be very slightly covered with soil, and never be buried more than half an inch beneath the surface of the ground; while those which retain their leaves should never have any part of their leaves buried in the soil.

Those which grow to a considerable height, such as Chinese chrysanthemums, and such as have weak and slender stems, should be timely supported by stakes, placed in the ground as near as possible to the stems, and the plants secured to them with garden matting. This should always be attended to as soon as the plants have attained the height of six or eight inches, as, if it is too long deferred, they will be liable to injury from strong winds or heavy rains; and also, because, if it is not performed in the early stages of their growth, it can never be done neatly afterwards, and the plants will remain unsightly throughout the whole season. Few persons, except professional gardeners, attach sufficient importance to this operation, and the consequence is, that plants of this description are deprived of the principal part of their beauty, and the gardens in which they are grown always present a slovenly and untidy appearance, however free they may be from weeds or rubbish, or however properly they may be attended to in other respects. A plant, for instance a Chinese chrysanthemum, is planted in the flower-border in the spring, and towards autumn its numerous stems will grow to the height of three or four feet, and because the person who cultivates it will not take the trouble to place a stake in the centre of the young shoots, and secure them to it with matting, they are blown down by the wind in all directions, and, besides having a most slovenly appearance, they greatly injure the plants that happen to be beneath them, and their flowers are completely spoiled with the dirt that is washed into them from the ground by rain. Such cases are by no means of

uncommon occurrence, not only with the plants mentioned, but with many others which produce only one stem ; and in other instances, the appearance of the plants is rendered equally unsightly by the rough and clumsy stakes that are placed for their support, and the careless manner in which they are tied to them. Now, if the prunings from apple, raspberry, and other trees and shrubs, were saved for this purpose, and the plants neatly and timely fastened to them, the flower-bed or border would present a very different appearance to what it now too frequently does, and a degree of interest would be added to it, of which few individuals of the class to whom these remarks are addressed, have any adequate conception.

Each stake should be as straight as possible, and only sufficiently strong to support the plant to which it is intended to be placed, as nothing is more unsightly than a large stake placed to a small plant : neither should it ever be longer than so as to reach to within a few inches of the top of the plant, for the greatest art in staking plants of any description is, to keep the materials which support them out of sight, and to make them appear as natural as possible. To effect this, where the plant has many stems, the stake should be inserted in the middle of them ; and, where it is only furnished with one stem, the stake should be placed at the back of it, so as not to be so readily perceived from the walk. It is no less important, however, that the plant should be neatly and properly tied to the stake ; and where the stems are not numerous, they should be fastened separately to the stake, and not bundled together, as is usually done. Besides which, the leaves should all remain perfectly free, and be kept as much as possible in their natural position ; and last, though not least, the matting used should be wetted previous to using, and only narrow strips of it employed, which should be neatly twisted, so as to appear as small as possible. These remarks on this subject have been thought necessary, as they will apply equally well to all descriptions of plants which require staking ; and also, to urge the adoption of a practice which contributes so largely to exhibit the beauties of flowers to the greatest advantage.

As soon as the flowers of any species begin to wither, if,

like the starworts, the flower-stems are only of annual duration, they should be immediately cut down to within an inch or more of the ground; as decayed or decaying flowering-stems have a very unsightly appearance. But if, as is the case with wallflowers and some others, the stems remain for more than one year, the flowers should be plucked off as they fade, unless seed is required, which will induce them to flower again in the same season. These directions are particularly applicable to wallflowers, which may, by this practice, be continued in flower for a great length of time.

Early in the spring each plant should be divided, if necessary; as plants of this description are apt to become too straggling; and the bed or border should be dug over, occasionally applying a little well-rotted manure, and shifting the plants every three or four years. All tubers which have been enumerated in the list before given, require precisely the same treatment as the others, except that they will multiply themselves, some of them in a similar manner to potatoes, and others, such as cyclamens, by a singular process, in which the seed naturally inclines to the earth, where, in course of time, it forms itself into a new tuber, which may then be detached from the plant.

It is worth considering that the outside portions of any patches of herbaceous plants are always the most healthy and vigorous, because youngest, and farthest from the old stems, and rooted in fresh soil. In dividing them, therefore, the old centre part of the plants should be rejected, and only the fresher portions be used.

Some kinds of perennials are peculiarly suited for growing on rocks, or among stones, roots, &c. The various species of fern, heath and savin, (among shrubs,) stone-crops, London pride, several kinds of alyssum and draba, wallflowers, red valerian, violets, with some of the campanulas, and pinks, and saxifrages, are best fitted for this purpose. They should each be provided with a little soil to grow in, and the means of draining off their surplus water, and be slightly shaded so as not to be burnt up in hot weather, but not be so covered as to be prevented from imbibing moisture by rain. A northern, or nearly northern aspect, where they get little sun, or a position beneath the shade

of large trees, will not be unsuitable for this tribe of plants. The stone-crop, the house-leek, *rhodiola rosea*, the common heath, and others, will look very pretty in patches on the roofs of cottages or outbuildings, or on walls, where they can be accommodated with a little soil.

3.—*Hardy Bulbs and Corms.*

These, though they are true perennials, are nevertheless so very different in structure and habit to those of the last division, and require such a peculiar system of treatment, that it has been thought better to consider them separately. They are by no means a numerous class of plants, and the flowers of some of them are of very short duration; still many of them are extremely interesting, and, on account of their appearing so early in the spring, are great and deserved favourites. They differ from those last treated of, in having bulging stems, which are capable of existing for a longer or shorter period when removed from the soil;



and the sole difference between bulbs and corms is, that the latter are solid, and usually of a round or flattened figure, while the former are composed of numerous layers, and generally taper more or less towards the summit, as may be clearly seen in the onion or hyacinth, of which last a figure is subjoined. The letter *a* points to the incipient flower-stem, *b b* to the embryos of future leaves and young plants, and *c* to the collar of the root.

A short list is here given of those that are most ornamental, and are capable of enduring the open air.

SELECT LIST OF HARDY BULBS AND CORMS.

From six inches to a foot high.

- Spring Snow-flake (*Leucojum vernum*). Fl. in January. White.
 Common Snowdrop (*Galanthus nivalis*). Fl. in January. White.
 Sulphur-coloured Crocus (*Crocus sulphureus*). Fl. in Feb. Yellow.
 Common Yellow Crocus (*C. luteus*). Fl. in February. Yellow.
 Dog's-tooth Violet (*Erythronium dens canis*). Fl. in March. Purple.
 Spring Crocus (*Crocus vernus*). Fl. in March. Purple.
 Early-flowering Squill (*Scilla præcox*). Fl. in March. Blue.
 Two-leaved Squill, and varieties (*S. bifolia, et var.*). Fl. in March.
 Various colours.
 Various species of Narcissus (*Narcissus Pseudo-narcissus, N. pusilla, N. jonquilla, N. patellaris, N. albus, et N. spurius*). Fl. in April.
 Various colours.
 Umbelled Star of Bethlehem (*Ornithogalum umbellatum*). Fl. in April. White.
 Racemose Grape Hyacinth (*Muscari racemosum*). Fl. in April. Blue.
 Vernal Squill (*Scilla verna*). Fl. in April. Blue.
 Undescribed Squill, and varieties (*Scilla non scripta, et var.*). Fl. in April. Various colours.
 Wood Tulip (*Tulipa sylvestris*). Fl. in May. Yellow.
 Nodding Star of Bethlehem (*Ornithogalum nutans*). Fl. in June. White.
 Common Corn Flag (*Gladiolus communis*). Fl. in June. Red.
 Alpine Meadow Saffron (*Colchicum Alpinum*). Fl. in July. Purple.
 Garden Crocus (*Crocus sativus*). Fl. in August. Violet-coloured.
 Yellow Sternbergia (*Sternbergia lutea*). Fl. in August. Yellow.
 Variegated Meadow Saffron (*Colchicum variegatum*). Fl. in August. Purple.
 Autumnal Meadow Saffron (*C. autumnale*). Fl. in Sept. Purple.
 Pallas's Crocus (*Crocus Pallasii*). Fl. in Sept. Lilac.
 Late-flowering Crocus (*C. serotinus*). Fl. in Oct. Violet-coloured.

From one to two feet high, and upwards.

- Crown Imperial (*Fritillaria imperialis*). Fl. in March. Yellow.
 Guinea-fowl Fritillary (*Fritillaria meleagris*). Fl. in April. Purple.
 Summer Snow-flake (*Leucojum æstivum*). Fl. in May. White.
 Tiger Flower (*Tigridia pavonia*). Fl. in June. Red and Orange.
 White Lily (*Lilium candidum*). Fl. in June. White.
 Xiphium Iris (*Iris xiphium*). Fl. in June. Blue and Yellow.
 Tiger Lily (*Lilium tigrinum*). Fl. in July. Red.

The cultivation of bulbs and corms is conducted in a very different manner to that of other perennials, inasmuch as the greater part of them require to be annually removed from the ground, and kept in a dry and dormant state for

a longer or shorter period. Like herbaceous perennials, they usually propagate themselves by offsets, which merely require separating from the parent to form a distinct plant, capable of producing leaves, flowers, and seed, when fully matured. Many of them may likewise be multiplied by seed, though this method is seldom had recourse to, except for the purpose of obtaining new varieties.

In all plants with bulgings of any sort above the root fibres, whatever these protuberances may be called, a store of prepared pulp is laid up there each season, for the purpose of producing the leaves and flowers in the succeeding season. It is clear then, that the more pulp there is accumulated, that is, the larger and fuller the bulging is, the stronger and finer will be the stems and flowers that are afterwards produced. Now, as flowering and fruiting exhaust the pulp, it is advisable, when fine plants are wished for, to cut off the flower-stems when the flowers are about to expand, put their cut stems in water, changing it every day, and allow them to flower there, while the leaves which remain on the plant will prepare pulp from the roots, which will be deposited in the bulb, and will cause it to form larger flower-bulbs for the ensuing year. In the same manner also, young and weak bulbs should be prevented from flowering, if they manifest any disposition to do so, by picking out the flower-buds as soon as they appear. By this method, the pulp that would have been expended in producing flowers, will be retained for the nourishment of the flower-buds of the succeeding year, and the whole bulb will be rendered stronger and larger.

As we have before hinted, bulbs and corms may be multiplied by offsets, which are usually produced in abundance. These should be annually removed from the parent plant, and planted in rows in an exposed situation, till they have attained a flowering state; during which time they should not be suffered to flower at all, for the reasons above given, and should be well supplied with water in the growing season, if this is not afforded them from natural causes.

In the cultivation of bulbs and corms, two principal points should be kept in view; viz., to keep them constantly growing after they have once started, by allowing them an abundance of water; and to preserve them during a certain

period in a perfectly dormant state, from the time their leaves begin to decay, by keeping them in a dry situation. The former of these, however, is generally amply performed by nature, while it is to the latter the cultivator must direct his attention. It is of great importance, in removing bulbs from the ground, to ascertain the precise time when they are capable of being taken up, as, if they are removed before they have ceased growing, or not till they have formed new roots, they will invariably be injured. It is also important that their leaves should never be cut off till they decay, otherwise the bulbs will never mature themselves properly. The best time for taking up bulbs or corms is immediately after their leaves have withered, and there are few of those enumerated in the preceding list which will require to be kept out of the ground more than a few weeks, and some of them not more than a few days. All young and weak bulbs should only be kept out of the ground a few days, and then planted again, as they cannot endure much drought ; but old and full-grown ones may be kept dry for several weeks, or even months, and will be much improved by it. They should be carefully wrapped in paper, and stored in dry drawers, or on shelves in an airy and cool room. Lilies, however, and even narcissuses, should only be taken up once in two years, for the purpose of removing their offsets, while crocuses, and other corms, may be taken up annually, provided they are not kept out of the ground till they commence growing. The autumnal flowering corms may be taken up as soon as the leaves decay, and will not be injured if they are kept out of the ground till the ensuing June or July. Tulips and hyacinths, being florists' flowers, will be hereafter treated of, and the time for planting out bulbs will be given in the calendar of work at the end. It is only necessary, therefore, here to add, that bulbs and corms should be planted at different depths, according to their size ; the larger sorts being placed six inches beneath the surface of the soil, and the smaller ones three or four inches. It is important that they be planted thus deep, as they will never thrive well when placed too near the light, and also to prevent their being injured by drought, or, where they remain in the ground all the winter, by frost.

Insects of various kinds are very destructive to bulbs; and they should therefore be attentively watched, especially about the time they appear above the ground, as, at this period of their growth, slugs are very apt to devour the young leaves and flower-buds. Plants of this description require a rather rich soil, and one that is moderately retentive of moisture, but not too much so. They should never be planted under the shade of trees or any other shelter, as an exposed situation is indispensable to the production of good flowers. Many of them, such as crocuses and irises, have a very pretty appearance when planted either in rows or otherwise in small beds, particularly if care is taken to have a good and pleasing variety of colours. But the best situation for the smaller sorts is along the edges of borders, as near as possible to the walk, where they will not be covered or injured by larger plants, and will produce a very showy effect. Snow-drops and crocuses are admirably adapted for this purpose; and if they are judiciously mingled with each other, their appearance will be very attractive in the spring months. The dog-tooth violet would also form a pleasing variety, if planted in a similar situation. The larger sorts, such as lilies, should be planted at the back of the border or towards the centre of a clump, and these latter must especially be removed every two or three years, as they will never flower well if allowed to remain in the same spot for a longer period, on account of the abundance of certain elements which they abstract from the soil; a circumstance which has only been very recently ascertained, but is now placed beyond all question.

4.—*Hardy Biennial Flowering Plants.*

Biennials are plants which, like annuals, generally die after they have produced their flowers and seeds, but are usually two years in perfecting these, and in many instances may be induced to flower for two or three successive seasons, by preventing them from maturing their seed. They are, however, naturally only of two years' duration, and hence the term "biennial" has been most appropriately applied to them. It must not from thence be inferred, that none of those plants which come under this denomi-

nation, ever produce their flowers for two or even three successive years; for this would lead to great errors in practice, as it is well known that many of the varieties of hollyhock continue to exist and flower for several years, though it may be observed, that young plants invariably flower in the greatest perfection.

This is a small, and, generally speaking, an uninteresting class of plants, as it contains very few species which are at all suitable for small gardens. This, therefore, will sufficiently account for the shortness of the succeeding list.

SELECT LIST OF HARDY BIENNIAL FLOWERING PLANTS.

Sad Rocket (*Hesperis tristis*). Flowers in April. Purple.
 Strict Flax (*Linum strictum*). Fl. in May. Yellow.
 Strict Corydalis (*Corydalis stricta*). Fl. in May. Yellow.
 Fragrant Rocket (*Hesperis fragrans*). Fl. in June. Purple.
 Dwarf Candy Tuft (*Iberis nana*). Fl. in June. Purple.
 Californian Eschscholtzia (*Eschscholtzia Californica*). Fl. in July. Yellow.
 Caucasian Gentian (*Gentiana Caucasica*). Fl. in July. Blue.
 Pinnate Sage (*Salvia pinnata*). Fl. in July. Purple.
 Virginian Flax (*Linum Virginianum*). Fl. in July. Yellow.
 Rose Campion (*Agrostemma coronaria*). Fl. in July. Red.

From one to two feet high, and upwards.

Queen's Stock (*Cheiranthus incanus*). Fl. in April. White.
 Sweet-scented Enothera (*Oenothera odorata*). Fl. in April. Yellow.
 Stavesacre (*Delphinium staphesagria*). Fl. in April. Blue.
 Broad-leaved Bugloss (*Anchusa latifolia*). Fl. in May. Blue.
 Umbellated Hound's Tongue (*Cynoglossum umbellatum*). Fl. in May. Purple.
 Spanish Catchfly (*Silene Hispanica*). Fl. in June. Cream-coloured.
 French Honeysuckle (*Hedysarum coronarium*). Fl. in June. Scarlet.
 White French Honeysuckle (*H. coronarium, album*). Fl. in June. White.
 Greater Snapdragon, and varieties (*Antirrhinum majus, et var.*). Fl. in June. Various colours.
 Purple Foxglove (*Digitalis purpurea*). Fl. in June. Purple.
 Official Hound's Tongue (*Cynoglossum officinale*). Fl. in June. Red.
 Biennial Honesty (*Lunaria biennis*). Fl. in June. Light Purple.
 Powdered Mullein (*Verbascum pulverulentum*). Fl. in June. Yellow.
 Medium Bell-flower (*Campanula medium*). Fl. in June. Blue.
 Biennial Enothera (*Oenothera biennis*). Fl. in June. Yellow.
 Aggregate Pink (*Dianthus aggregatus*). Fl. in June. Purple.
 Yellow Horn Poppy (*Glaucium flavum*). Fl. in June. Yellow.
 Bundle-flowered Poppy (*Papaver floribundum*). Fl. in June. Scarlet.
 Purple Sheep's Scabious (*Scabiosa atropurpurea*). Fl. in July. Purple.

Common Viper's Bugloss (*Echium vulgare*). Fl. in July. Red.
 Violet-flowered Viper's Bugloss (*E. violaceum*). Fl. in July. Blue.
 Large-flowered *Oenothera* (*Oenothera grandiflora*). Fl. in July.
 Yellow.
 Intermediate Candy Tuft (*Iberis intermedia*). Fl. in July. White.
 Tall Rocket (*Hesperis elata*). Fl. in July. Pink.
 Biennial Gaura (*Gaura biennis*). Fl. in August. Red.
 Tawny Horn Poppy (*Glaucium fulvum*). Fl. in August. Orange.
 Rosy Hollyhock, and varieties (*Althæa rosea, et var.*). Fl. in Aug.
 Various colours.
 Biennial Lavatera (*Lavatera biennis*). Fl. in August. Red.
 Lance-leaved Coreopsis (*Coreopsis lanceolata*). Fl. in Aug. Yellow.
 Conspicuous Eryth (*Erythrolæna conspicua*). Fl. in Sept. Red.
 Hoary Starwort (*Aster canescens*). Fl. in Sept. Violet-coloured.

Biennials may all be raised from seed, which is produced abundantly by most of the species ; and the best time for sowing them is as soon as the seed is ripe. With those that flower very late in the season, however, it would be injudicious to sow the seed at the time of ripening, and it is much better to preserve it till the spring. The seed should be sown in shallow drills, or in small beds of four or five feet in width, in an exposed situation ; and the young plants should be thinned to a proper distance from each other as soon as they appear, that they may not grow too weak and sickly, also taking care to remove all weeds. If the seed is sown early in the autumn, the plants will be large enough to remove to the borders in the spring, and, like perennials, they should be taken up with as much soil as possible about the roots. But if they are not sown till the spring, they should be retained in the seed bed till the early part of the succeeding spring, when they may then be removed to the borders in which they are intended to flower. Those which are sown early in the autumn, will frequently flower in the following summer ; but, if they are not sufficiently strong, the tendency to flower should be timely checked, and they will blossom much finer in the ensuing year.

Though all biennials are capable of being multiplied from seed, there are many which would produce different varieties from seed, and consequently very fine sorts of such can only be increased by cuttings. This is the case with many of the beautiful varieties of snapdragon ; and by frequently taking off cuttings from them, and striking them under a

hand-glass in a warm situation, they may be brought into flower in almost constant succession through the summer months. Hollyhocks, likewise, and rockets, may be increased by dividing the roots, and will frequently flower, as has been before stated, for several years successively. The double varieties of the Brompton and Queen stocks neither produce seed nor are capable of being increased by cuttings; therefore it is recommended, by writers on the subject, to plant a single one of the same colour by the side of the double one, when, it is said, the seeds of the single one will produce plants with double flowers. This theory, it must be confessed, is a rather strange one, but in the absence of any other sure method of reproducing these plants with double flowers, it may be adopted, and, perhaps with success.

The general treatment given to biennials is precisely the same as that recommended for perennials, and particular attention should be paid to securing them timely and properly to stakes of such a size as they may require. The numerous varieties of hollyhock should especially be staked as soon as the flower-stems commence growing; and if stakes of a sufficient size and strength cannot readily be procured, they should be planted at a short distance from a wall or paling, and loosely fastened (not trained) thereto. All others that require supporting, should be secured to stakes in the early period of their growth, according to the directions before given for perennials.

In the case of such plants as produce no seed, or those of which the seed is not desired, particularly with snapdragons and Brompton stocks, if the flowers are plucked off as soon as they begin to decay, they soon produce a succession of blossoms, and will not only continue flowering during the greater part of the season, but will not unfrequently (especially the former) flower for several years. But, however desirable this may be with very fine sorts, the flowers produced on such plants are never so good as those of young plants, and hence it is much better to renew them annually, either by cuttings or seed.

The majority of biennial flowers will flourish in any common garden-soil, but a light and rather rich loam is most suitable for them. The various species of *cenothera*,

however, are exceptions to this rule, as, in a rich soil, they will expend all their strength in producing shoots and leaves, and the flowers will be much larger and finer if the plants are grown in a rather sterile soil.

5.—Hardy Annual Flowering Plants.

Annuals, as their name implies, exist only for one year, and, having perfected their seed, perish. It is, however, an interesting fact, that these plants never die (except from casualties) till they have furnished the means of reproducing their species, or, in other words, till they have ripened their seeds; and if the flowers are constantly plucked off as they decay, the plant will not perish unless it is killed by frost or some other principle equally destructive. They are an extremely interesting tribe, as they furnish the flower-beds and borders with some attractive feature throughout the whole of the summer months, and in short, during the whole period through which plants are capable of flowering in the open air. Besides which, the flowers of most of them are very showy and ornamental, and they vary in height from a few inches to several feet; their flowers are also of the most extensive diversity of form and colour, are usually produced in great profusion, and they are certainly some of the most beautiful and delightful objects which are known and cultivated in this country. From an almost innumerable quantity of species, the following have been selected as being some of the most ornamental, and the most easily obtained; and, if they are once purchased, or procured from a friend, they may be continued for an indefinite period, by annually preserving their seeds.

SELECT LIST OF HARDY ANNUAL FLOWERING PLANTS.

From six inches to one foot high.

Delicate *Oenothera* (*Oenothera tenella*). Fl. in April. Purple.

Indian Pimpernel (*Anagallis Indica*). Fl. in May. Blue.

Venus's Looking-glass (*Prismatocarpus speculum*). Fl. in May. Purple.

Large-flowered *Collinsia* (*Collinsia grandiflora*). Fl. in May. Blue.

Purple *Oenothera* (*Oenothera purpurea*). Fl. in May. Purple.

Linear-leaved *Collomia* (*Collomia linearis*). Fl. in June. Red.

Smaller Indian Cress (*Tropaeolum minus*). Fl. in June. Yellow.

Trailing *Oenothera* (*Oenothera humifusa*). Fl. in June. Purple.

- Elegant Gypsophila (*Gypsophila elegans*). Fl. in June. Pink.
 Downy Pink (*Dianthus pubescens*). Fl. in June. Red.
 Mignonette (*Reseda odorata*). Fl. in June. Green.
 Umbellated Madwort (*Alyssum umbellatum*). Fl. in June. Yellow.
 Bitter Candy Tuft (*Iberis amara*). Fl. in June. White.
 Umbellated Candy Tuft (*I. umbellata*). Fl. in June. Purple.
 Trailing Nolana (*Nolana prostrata*). Fl. in July. Blue.
 Scarlet Collomia (*Collomia coccinea*). Fl. in July. Red.
 Showy Nemophila (*Nemophila insignis*). Fl. in July. Blue.
 Lesser Convolvulus (*Convolvulus minor*). Fl. in July. Blue.
 Headed Gilia (*Gilia capitata*). Fl. in July. Blue.
 French Flax (*Linum Gallicum*). Fl. in July. Yellow.
 Four-winged Enothera (*Enothera tetraptera*). Fl. in July. White.
 Armeria (*Dianthus armeria*). Fl. in July. Red.
 Sweet-scented Candy Tuft (*Iberis odorata*). Fl. in July. White.
 Dwarf Lupin (*Lupinus nanus*). Fl. in July. Blue.
 Spreading Loasa (*Loasa patula*). Fl. in July. Yellow.
 Trifid Vervain (*Verbena trifida*). Fl. in August. Purple.
 China Aster, and varieties (*Callistema hortense, et var.*). Fl. in Aug.
 Various colours.
 Autumnal Pheasant's Eye (*Adonis autumnalis*). Fl. in Sept. Dark red.
 Californian Platystemon (*Platystemon californica*). Fl. in June and
 July. Yellow.
 Wrangle's Eutoca (*Eutoca Wrangeliana*). Fl. in June and July. Blue.
 Californian Lasthenia (*Lasthenia californica*). Fl. in June and July.
 Yellow.
 Spotted Nemophila (*Nemophila maculata*). Fl. in June and July
 Spotted.
 Atriplex-leaved Nolana (*Nolana atriplicifolia*). Fl. in June and July.
 Blue and yellow.

From one to two feet high, and upwards.

- Headed Strawberry Blite (*Blitum capitatum*). Fl. in May. Red.
 Annual Stock, and varieties (*Mathiola annua, et var.*). Fl. in May.
 Various colours.
 Two-coloured Calliopsis (*Calliopsis bicolor*). Fl. in May. Yellow.
 Pretty Clarkia (*Clarkia pulchella*). Fl. in June. Pink.
 Elegant Clarkia (*C. elegans*). Fl. in June. Pink.
 Varieties of Rhoeas Poppy (*Papaver Rhoeas, var.*). Fl. in June.
 Various colours.
 Ajax's Larkspur, and varieties (*Delphinium Ajacis*). Fl. in June.
 Various colours.
 Comfrey, and varieties (*D. consolida, et var.*) Fl. in June. Various
 colours.
 African Cysticapnos (*Cysticapnos Africanus*). Fl. in June. Red.
 Sweet Pea (*Lathyrus odoratus*). Fl. in June. Various colours.
 Tangier Pea (*L. tingians*). Fl. in June. Purple.
 Glossy Loasa (*Loasa nitida*). Fl. in June. Yellow.
 Scarlet Cacalia (*Cacalia coccinea*). Fl. in June. Orange.
 Erect African Marigold (*Tagetes erecta*). Fl. in June. Yellow.
 Elegant Zinnia (*Zinnia elegans*). Fl. in June. Scarlet.
 Annual Sun-flower (*Helianthus annuus*). Fl. in June. Yellow.

- Common Marigold (*Calendula officinalis*). Fl. in June. Orange.
 Great Cape Marigold (*C. hybrida*). Fl. in June. White.
 Lindley's Enothra (*Enothera Lindleyi*). Fl. in June. Pink.
 Annual Xeranthemum (*Xeranthemum annuum*). Fl. in July. Purple.
 Twiggy Strawberry Blite (*Blitum virgatum*). Fl. in July. Red.
 Pinnate Schizanthus (*Schizanthus pinnatus*). Fl. in July. White and purple.
 Spreading Schizanthus (*S. porrigens*). Fl. in July. White and purple.
 Retuse Schizanthus (*S. retusus*). Fl. in July. Crimson and yellow.
 Greater Convolvulus (*Convolvulus major*). Fl. in July. Various colours.
 Varieties of the Somniferous Poppy (*Papaver somnifera*, var.) Fl. in July. Various colours.
 Spanish Fennel Flower (*Nigella Hispanica*). Fl. in July. White.
 Yellow Lupin (*Lupinus luteus*). Fl. in July. Yellow.
 African Hibiscus (*Hibiscus africanus*). Fl. in July. White and brown.
 Glutinous Hawkweed (*Hieracium glutinosum*). Fl. in July. Yellow.
 Spreading African Marigold (*Tagetes patula*). Fl. in July. Orange.
 Paradoxical Nolana (*Nolana paradoxa*). Fl. in August. Blue.
 Hairy Lupin (*Lupinus hirsutus*). Fl. in August. Blue.
 Melancholy Amaranth (*Amarantus hypochondriacus*). Fl. in Aug. Dark red.
 Love lies bleeding (*A. caudatus*). Fl. in August. Red.
 Sweet Sultan (*Centaurea moschata*). Fl. in August. Purple.
 Dark purple Salpiglossis (*Salpiglossis atropurpurea*). Fl. in August. Purple.
 Fine-leaved Enothra (*Enothera tenuifolia*). Fl. in Aug. Yellow.
 Rose of Heaven (*Lychnis cæli rosea*). Fl. in August. Pink.
 Golden Bartonia (*Bartonia aurea*). Fl. in July and Aug. Yellow.
 Broad-rayed Callichroa (*Callichroa platyglossa*). Fl. in July and August. Yellow.
 Lore's Bell-flower (*Campanula Lorei*). Fl. in July and August. Blue.
 Peroffski's Hedge Mustard (*Erysimum Peroffskianum*). Fl. in June and July. Orange.
 Viscid Eutoca (*Eutoca viscida*). Fl. in July and August. Blue.
 Thrice-cut Malope (*Malope trifida*). Fl. in June and July. Red.

The cultivation of annual flowers is so exceedingly simple, and is conducted in such a perfectly natural manner, that few directions appear to be necessary. Indeed, many of them, if left to themselves, would scatter their own seeds, and thus reproduce themselves without the assistance of man. Were this, however, allowed to take place, the garden, instead of being a model of neatness and good order, would soon become a wilderness of confusion, and the plants, instead of being arranged so as to have a pleasing variety of colours, would grow in dense masses of one sort

and colour, and all order and regularity, which, to a certain extent, is so necessary and desirable in a garden, would be at once destroyed. Besides, there are many plants which will not reproduce themselves in this way ; and others which would, are incapable of standing through the winter in the open ground. It is therefore important, that some general rules should be given for their management, and these will be condensed into as small a compass as is compatible with the subject.

The main object in cultivating annual plants being to induce them to flower and perfect their seeds, it is important that every feature in their cultivation should tend to promote this desirable and important end. For this purpose, seeds of annual plants should never be sown (except a few sorts which will not bear transplanting) where they are intended to flower ;—a practice very generally recommended for the sake of saving trouble. To save trouble, however, at the expense of the health or beauty of the plants, appears somewhat paradoxical, as it is undoubtedly the object of every cultivator to have his plants or flowers as fine as possible. This object, then, cannot be attained by sowing annuals where they are desired to flower, as they require to be transplanted, on the same principle as cabbages, to check their growth, and enable them to form flowers, instead of so many stems and leaves. It has been before stated that these remarks will not apply to all annual plants ; for, on the contrary, there are some, such as poppies, mignonette, sweet peas, lupins, and a few others, which have so few fibrous roots that they would be much injured by being transplanted, and of course it would be extremely injudicious to subject these to such an operation. These should be sown in round patches in the bed or border where they are to flower, and covered with about half an inch or an inch in depth of light soil. As soon as the young plants appear, they should be *successively* thinned to a proper distance from each other, leaving only three, four, or six in the circle, according to their size. The word *successively* is used, because, if they are at once thinned out to the required distance, some of the plants will very probably die or be destroyed by insects, and a deficiency would thus be occasioned ; whereas, if they are thinned out

at successive intervals, such an occurrence might be easily obviated.

But the majority of annual plants will derive much benefit from being transplanted in an early stage of their growth, as any luxuriance in stems and leaves will thus be checked, and new root-fibres will be formed, which will furnish a fresh supply of nourishment for the development of the flowers. Besides which, where plants of this description are sown in circles in the flower borders, they will occupy too large a space of ground,—too many plants of one sort will be brought together,—and as they will require thinning, the thinnings will either be wasted, or it will be almost impossible to take them up with sufficient care for transplanting, without injuring the remaining plants. We therefore recommend that, with the exception of the sorts before named, and some few others, all annual plants be raised on a bed or border prepared for the purpose, and from thence transplanted to the situation in which they are required to flower.

Early in March, a bed or border of light rich soil should be prepared, and the hardiest sorts of annuals sown in shallow drills about three inches apart, and half an inch or more in depth, according to their size. If any severe weather occurs after they appear above the surface of the ground, they may be sheltered at night, by placing hoops of willow or other flexible wood over the bed, and covering them with garden mats; but this protection will seldom be necessary with the hardy sorts. Towards the latter end of March, or early in April, a similar bed may be prepared, and the more tender kinds sown in it in the same manner: these will especially require protection if frosty nights occur, which may be effected according to the preceding directions. Neither of these sowings will require any attention till they have formed three or four leaves, except the weather should prove dry during this time, when they may be gently watered in the morning (not in the evening) of the day. If a little stable dung is at command to place beneath the bed on which the tender sorts are sown, they will germinate more speedily; though this is not essential, and, where it is employed, they should be well protected during the night, when the weather is unfavourable. When

the plants have formed four or five leaves, they will be fit for transplanting, and a mild and cloudy evening should be chosen for performing this operation. The plants should be taken up carefully from the bed with a small three-pronged fork, taking care not to injure their roots; and those with long tapering roots should have the points of their roots cut off in the same manner as has been before recommended for cabbage, but on no account should the small fibrous roots be shortened or injured. They should be planted in clusters of three, at three, four, or six inches apart, according to their size; and the more tender sorts should be covered each evening with an inverted flower-pot till they become established. They should also be slightly shaded during the heat of the day, if they evince any signs of drooping, by sticking a few laurel or other green branches in the ground on the south side of the plants. Water must be constantly supplied to them if the weather be not showery, and it should be given in the morning of each day, taking care never to wet the leaves. As they are very liable to be attacked by slugs and snails, perhaps it is safer to plant rather more thickly, and put five or six plants in a group. Where there is sufficient space, larger patches of annuals, by presenting a broader mass of one colour, are most desirable, and the plants support each other better. A small bed, filled entirely with one sort, or a larger one with concentric circles of different sorts, the colours being well harmonised, will have an exceedingly good and gay effect.

To ensure a succession of flowers, other sowings may be made in April, May, and June, and treated precisely in the same manner. Annual plants require to be planted in a very exposed situation, for, as an abundance of fine and showy flowers is most desired, these will never be produced except they are afforded a sufficient degree of solar light. They should, for the same reason, never be planted in a rich soil, which would cause them to produce shoots and foliage rather than flowers, and some of them, such as *Oenotheras*, require to be planted in a very poor soil. Timely and judicious staking is of first importance, and we need only refer the reader to the remarks on this subject under the head of perennials, where the manner of per-

forming this operation is fully detailed. As with biennials, where the seed of any particular plant or clump of plants is not desired, their flowering may be greatly prolonged by plucking off the flowers as they fade, and not allowing the plant to produce seed. Sweet peas may thus be continued in flower till the frost appears to destroy them, and will form a very pretty feature amongst the autumnal flowering plants. Mignonette will also flower all the season if similarly treated, and may even, when potted and sheltered in winter, be converted into a sort of perennial by this means. Candy tuft will likewise produce a second or a third display of bloom if the flowers be removed as fast as they fade. But in this and all other similar cases success can only be attained by the most prompt and careful attention; for if once the seed is allowed to develop itself, the plants will be weakened, and never again flower finely. When the seed of any plant is intended to be saved, (which should be particularly attended to by persons of small means,) as soon as it is properly matured, the plants should be taken up and the seed-pods cut off and placed on paper in the sun to dry, removing it of course at night and in wet weather to a sheltered place. Seed should always be collected in fine and dry weather, and never be suffered to remain on the plant till it is too ripe, otherwise it will be liable to be scattered by the wind. The best and safest method is to gather each pod as they severally ripen, just before it begins to burst, and having dried it on paper or canvas as before directed, to rub out the seeds and preserve them in paper in a dry situation through the winter.

A few plants of the hardy kinds, if allowed to remain, will scatter their own seeds; and if these are properly thinned, or carefully transplanted to any desirable situation, they will frequently stand through the winter, and flower in great beauty early in the spring. Or the hardier kinds may be sown, at the end of August or beginning of September, where they are to remain.

In planting annuals, as indeed all other flowering plants, due regard should be paid to their height, and the colours of their flowers, so as to have the smallest plants in the front of the bed or border, and the larger ones in the centre or at the back; and likewise to have as great a variety of

colours as possible. To effect this latter purpose, it is important, unless the plants are well known, to write the colour of annual flowers on the paper in which the seeds are kept, as by this means a proper admixture of colours may be ensured, and no two plants of the same colour will be planted near each other. In the general effect produced by a border or bed of flowers, this feature is of more importance than most persons are aware, and should never be neglected by any individual who consults the beauty, in general appearance, of the piece of ground which he may be able to devote to the cultivation of flowers. A proper attention to height is, however, of still greater importance, and in proportion as flower beds or borders are planted with these two points in view, to the same degree will they be ornamental or unsightly.

As with perennials, the dead or decaying stems of annuals should be promptly removed. Nothing gives a more littery appearance to a garden than such things; and, in autumn, they form a sort of nucleus or harbourage for decayed leaves and insects.

There is a small class of annuals, with climbing habits, which deserve special notice, and may be made great ornaments to a garden. The sweet pea and the larger convolvulus are well-known examples. The varieties of *Tropæolum majus*, *Tropæolum canariense*, *Loasa nitida* and *alba*, and the everlasting pea and *Tropæolum tuberosum* among perennials, are all quite hardy enough to be easily grown, and are exceedingly pretty. The seed may be sown in pots, and the seedlings afterwards planted out, or put at once in the ground, rather more thickly than the plants are wanted, to allow for accidents. A few bushes stuck in the ground around an irregular cluster of plants, leaving the latter to throw themselves over the stakes in a loose or tangled manner, will be the most appropriate way of treating them, especially as the *Loasas* are armed with such powerful stings as to render it imprudent to touch them. The convolvulus, however, may be trained to a trellis, or over a porch, or to the stem of a tree, or amongst a few scarlet runners, as it grows taller than the rest, and requires higher stakes or other support. The *Tropæolum canariense* is an elegant plant for growing in pots.

For decorating the windows of a house, or supplying a little variety of ornament to a flower stage out of doors, or an in-door flower-stand, a few annuals may fitly be grown in boxes or pots, in which their seeds should either be sown, or they should be transplanted into them when very young. Mignonette and stocks mixed, *Nemophila insignis*, and any low-growing annual that has a disposition to trail, and flowers abundantly and for some length of time, will answer this purpose admirably. But the numerous and beautiful sorts of half-hardy annuals, which we have not enumerated in our list, will often be even more appropriate. *Rhodanthe Manglesii*, the species of *Portulaca* and *Calandrinia*, the showiest variety of *Phlox Drummondii*, *Lobelia gracilis*, the *Clintonias*, and *Mesembryanthemum tricolor*, will make a very good collection of such plants. They must be treated, for the most part, as hereafter recommended for potted plants in general; requiring a rather light soil, careful potting, and constant attention in regard to water. They may be reared as before directed in a slight hot-bed, or be sown in the pots, in the month of April, and kept in the house or protected at night until frosts are over. When placed in their final quarters, there should not be more than three or four plants in a pot of from four to five inches diameter at the top.

The seeds of many varieties of annuals are now largely obtained from Germany, where they have brought some of the kinds to extraordinary perfection. German ten week stocks, asters, and larkspurs, are superior to anything of the kind raised in this country. But they degenerate if reared from seeds saved in Britain. Where, therefore, a small sum yearly can be spared for the purchase of these, they will be found a great acquisition to a garden. They should be treated as tender annuals.

6.—*Florists' Flowers.*

The flowers peculiarly called "florists' flowers" are those which *sport*, as it is termed, or in other words such as produce new and distinct varieties when propagated from seed; and many of them even change the colours of their

flowers. Flowers of this description are in fact nearly all the productions of art, having been raised chiefly by high cultivation from insignificant and almost worthless plants ; and they are among the most striking proofs of the skill and ingenuity of man which the vegetable kingdom affords. Many florists' flowers, however, are often prized from mere fancy and caprice, rather than for real and sterling merit and beauty, and their cultivation, when pursued too eagerly, has frequently led to evil results. Thus the Dutch are said to have gambled in tulips, the bulbs rating as high as £1000 each, though probably never seen by the persons who bought them. High prices are sometimes given for a single plant of some florists' flowers when new and rare, and as much as five guineas have been paid for an auricula or polyanthus, and twenty or even fifty guineas for a tulip—a piece of folly, when it is merely an indulgence of fancy—a mercantile speculation, when for the purpose of breeding more of the same sort for sale. It is, however, a dangerous speculation, and many respectable individuals have reduced themselves and their families to penury and want by too great an indulgence in it.

The manufacturing classes of some parts of England and Scotland are very enthusiastic florists, and derive great pleasure from their gardening societies. At the meetings of these societies, premiums are awarded to those who exhibit the finest flowers, and keen competition is awakened ; but such societies would not succeed well among the agriculturists, as their labour is all out of doors, and gardening consequently is no relaxation. As many individuals for whom this little work is intended take a delight in growing plants of this description, a few plain directions will now be given for cultivating the principal sorts.

The old florists' flowers are auriculas, polyanthuses, pinks, carnations, tulips, hyacinths, ranunculuses, and anemones ; to which have been lately added dahlias, and pansies, or hearts-ease. These are all perennials ; but as they each require a peculiar system of cultivation, they have been omitted under the head of perennials, and are here introduced.

It is obviously impossible, in a work of this size, to give more than a very brief outline of the principles on which

all or any of the plants thus enumerated should be cultivated ; the reader therefore who wishes for more ample information on this subject, must refer to works of larger size and greater cost. Taking each tribe in the order above given, we commence with auriculas, which, as they require protection through the winter months, scarcely come within the design of this work. They are certainly very beautiful and ornamental plants, but are only cultivated by professed florists, or such mechanics as we have before mentioned, who are enabled to devote their leisure time to this interesting pursuit. They may be multiplied either by seed or offsets ; the former method being practised when new sorts are desired, and the latter for continuing old and known varieties. The offsets may be removed as soon as the flowers have faded, and planted separately into small pots, in a rich soil, composed of one-half of well-decayed dung, one-fourth of turf loam, one-eighth of peat or heath-soil, and the rest rotten leaves and river sand ; the whole having been freely exposed to the frost in the preceding winter. At the time of taking off the offsets, the whole of the plants should be potted in a similar compost, and then placed in a shaded situation, or at once removed to the frame in which they are to remain all the winter. They must either be protected through the winter in a frame, or under a sheltered wall, and covered with boards placed against the wall in a sloping direction, as they cannot endure severe frost. It is important that, wherever the plants are kept, they should be placed on boards, bricks, or coal ashes, to prevent worms from entering the pots, and also to prevent the bottoms of the pots from being clogged up with soil, which would hinder the circulation of the water that may be applied to them. In the spring, the plants must be well exposed to light and air, in fine weather ; and in the month of February, cultivators recommend that the soil on the surface of the pots should be removed to the depth of an inch, and its place supplied with fresh compost, which it is said will improve the blooms. Liquid manure is also recommended to be applied once a week at this season. If, when the plants begin to show flower, more than one flower-stem arises to a plant, the weakest one should be removed ; and when the buds are of a sufficient size, they

should be regularly thinned, leaving only eight or ten of the finest to each umbel. When they are in full flower, they should be placed in a shaded situation, which will continue them in bloom for a greater length of time. After flowering, they may be again potted, and treated as before directed.

Polyanthuses, with which may be included double primroses, though they are most successfully cultivated when kept in pots, will nevertheless grow very fine when planted in the open border, requiring no other protection than to be planted in a shaded situation (a border with a northern aspect is best). They may be propagated in a similar manner to auriculas,—by division of the roots for increasing old sorts, and by seed for obtaining new varieties. The division of the roots must be effected by the hand, and not with a knife, and should be performed after the plants have ceased flowering. The old plants should be taken from the ground at this time, and after separating the young offsets from them, they should all be planted into a border of loamy soil that has been fresh dug and well manured, and is situated on the north side of a wall. If kept in pots, they may be treated in the same manner as auriculas, and the flowers should also be thinned to render them finer. Seed of the polyanthus (the double primrose does not produce seed) may be sown in the autumn, in pans or boxes of loamy soil, and very slightly covered with earth; the young plants will appear in the spring, and when they are of a sufficient size, they may be planted out in a shady border of rather rich loamy soil, where they will require no more than ordinary attention. They will flower in the following spring, and the best sorts should be transplanted after flowering into a similar border, while the worthless ones may be thrown away.

Pinks and carnations are so similar to each other in habit, and their treatment being in most respects the same, it will be convenient to offer a few general observations which will apply to both. With regard to their propagation, however, they differ materially, as carnations are multiplied by layers, while pinks are increased by cuttings, or, as they are usually termed, *pipings*. For the method of propagating carnations, we refer to the article on “layers” in a former part of this work, and now proceed to offer a few

remarks on the propagation of pinks. The pipings or young shoots of pinks, should be taken off while the plants are in flower ; and having prepared a small piece of ground for them in a south border of a light loamy (and rather sandy) soil, this should be well watered, and the pipings, when prepared, inserted into it, and covered with a hand-glass. The pipings should be taken off just below the second or third joint, and the end cut very smoothly ; the lower circle of leaves should then be stripped off, and the upper ones left entire. In this state they should be planted in the soil about half an inch in depth, and two inches apart, and having covered them with the hand-glass, they should be constantly shaded when the sun is shining, though not at other times. It is essential to the success of the operation, that the pipings be placed firmly in the soil, and watered afterwards as they may require. After the first week or fortnight, the plants should occasionally receive air, by tilting the front of the glass with a brick or block of wood. As soon as they appear to have struck root, they should be more exposed to light and air, and then removed to the bed or border where they are to remain.

Pinks and most sorts of carnations are sufficiently hardy to endure the winter of our climate in the open air, and though potting is recommended for the choice sorts, we shall not here advert to it. The soil for these plants should be composed of three parts of turfy loam, two parts of well-rotted manure, and one part of river sand ; a little lime will also be of great benefit, for the purpose of destroying insects. This compost should be well exposed to the frost in the previous winter, and frequently turned for the purpose of incorporating it. The pipings of pinks should be planted out immediately after they are struck, and the layers should also be separated from carnations as soon as they have formed roots, and planted in a compost of the same materials. They require little attention in the winter, except it is thought necessary to protect them with mats or straw, which will seldom be wanted ; and in the spring, a top-dressing of well-rotted manure is recommended to be placed on the surface of the ground, with the view of keeping the roots cool and moist. When the flower stems

appear, if it is desired to have the flowers fine, all the stems should be removed but three or four, and if the flowers manifest any disposition to burst, a band of garden matting should be fastened round them, which will effectually prevent this deficiency. If new sorts are desired, these may be obtained from seeds, which, however, are seldom produced.

Tulips and hyacinths, being bulbs, require a very different treatment to those florists' flowers hitherto noticed. Like all other bulbs, they must be removed from the soil during a certain period, and again replaced in it before they recommence growing. Tulips and hyacinths may be both propagated by seeds, though these will produce new varieties, and this method is therefore seldom employed except by florists. The usual mode of propagating them is by offsets, which are generally produced each year, and will flower after about two years from the time of separating them. The bulbs should be planted in beds, if possible, in an exposed situation, in the month of November; but these remarks apply more particularly to tulips, as hyacinths are seldom planted in the open ground. The soil most suitable is a rich turfy loam, manured with a small portion of well-rotted horse-dung, and in a bed of this compost the bulbs should be planted in rows, at six inches apart either way, and inserted in the soil by means of a dibble to the depth of three or four inches. As soon as the leaves appear, the plants should be attentively watched, to prevent the attacks of insects, which attention will likewise be necessary through the whole period of their growth. When the flowers appear, if some slight shading can be afforded them, they will continue in bloom a much greater length of time; and the taller-growing sorts, which of course should be planted in the centre of the bed, will probably require supporting with slender stakes. As soon as the flowers have fallen, if seed is not desired, the seed-pod should be picked off, which will promote the decay of the leaves and the ripening of the bulbs; and when the leaves and stem have completely decayed, the bulbs should be taken from the soil in dry weather, and kept in dry boxes or drawers till the time of planting. At the time of taking up the bulbs, all offsets should be separated, and these

should not be planted with the old bulbs in the autumn, but should be placed in some retired part of the garden by themselves, where they can be well exposed to the sun. If they manifest any disposition to flower the first year, this should be duly checked, and they will be in a proper state for flowering in the second season. Hyacinths, if grown out of doors, should have a much more sandy soil, with a mixture of leaf mould, well decayed. The beds, as with tulips, should be slightly raised, and particularly well-drained.

Although many hyacinths will flower well according to the treatment thus detailed, they will also be very interesting ornaments to the sitting-room, if planted in pots, or kept in water-glasses. If hyacinths are planted in pots, the soil used should be a light sandy loam, with a slight addition of well-rotted manure, and the bulbs should be planted so as to allow the upper part to stand above the level of the soil. An excellent method of accelerating their flowering, is to plunge the pots containing them into the ground, and cover them with about six inches of old bark, leaf soil, or other light material, in which situation they will come into flower much sooner, and the flowers will likewise be better, than if they had been left exposed. As soon as they appear above the surface of the material used, they may be removed to the window of a dwelling-room, where, if they are kept as near as possible to the light, and liberally supplied with water, they will flower beautifully. If they are not frequently turned round, however, so as to present every part in succession to the light, they will grow one-sided and deformed. It may here be remarked, that the choicer species of *Narcissus*, if treated in the same manner, will have an equally interesting appearance, and flower in as great perfection.

With respect to the management of hyacinths in water-glasses, it is likewise better to plant the bulbs in some very light soil, such as leaf mould, and when they have commenced growing, to remove them to the glasses, taking care not to injure the roots. The glasses should invariably be of a dark colour, and the water in them should be occasionally changed. They should also be kept as near as possible to the light; and when the flowers begin to fade,

the bulbs may be removed to the open ground to mature themselves. Like those grown in pots, they must be almost daily turned into a fresh position ; and as the perfection of their appearance consists in having them dwarf and strong, they cannot have too much light. When, from being kept in a very warm room, and brought early into flower, they require supporting, this may be done by means of strong wire, attached to the neck of the glasses, and rising perpendicularly on one or both sides of the stem. Glasses are now easily procured with this appendage very neatly affixed to them. But if the plants are properly attended to as regards light, and almost daily shifting, and are not too much forced, they ought not to require such aid.

Ranunculuses and anemones have tuberous roots, and therefore require a still different mode of treatment. Being sufficiently hardy to endure the open air in our climate without protection, and also being highly beautiful and ornamental, as well as much more easily procured than tulips or auriculas, they should find a place in every garden, at least some of the more common sorts. Propagation may be effected, either by seeds, or by dividing the roots ; but the latter is by far the most speedy and effectual method. Ranunculuses and anemones will thrive well under the same mode of treatment, therefore the following brief remarks may be considered equally applicable to each.

The tubers should be planted about the month of October, for a general rule ; while some others may be put in early in February, by which means a succession of flowers will be obtained. The soil most suitable for them is a rich loam, with a slight admixture of well-rotted dung ; and they should be planted in narrow beds, at six inches apart either way. The best mode of planting them is to draw shallow drills along the surface of the bed, and lightly press the tubers into the soil at the proper distance in the drill ; this is preferable to planting them with a dibble. They should be covered with about two inches' depth of soil ; and in selecting the tubers for the purpose of flowering, both large and small ones should be rejected, as those of a moderate size will flower best. Particular care should

also be taken to keep the eye or bud of the tubers uppermost, otherwise they will not flower so well. Those planted in autumn will probably require some slight protection in very severe weather, which may be effected by placing dry litter or straw on the beds, always removing it when the weather is more favourable, and exposing them fully to light and air. As soon as they appear above the ground, it is recommended that the soil be pressed firmly about each plant, to prevent any injury they might receive from drought. As soon as the flowers expand, if some light and thin shading is afforded them during the more powerful heat of each day, they will continue in bloom a much greater length of time, and also preserve their colours better. The time for taking up the tubers is as soon as the leaves decay; but as anemones frequently retain their leaves longer than is desired, some persons shelter them with mats or canvas in very wet weather, which tends to promote the fading of the leaves, by keeping the plants dry. After the tubers are taken from the soil, they should be carefully dried, and after all soil is removed from them, (which should be done with great care,) they should be stored in dry bags or boxes, till the time for planting. The young offsets or tubers should be detached about a month after they are taken from the ground, as it is said that they are liable to shrivel when this is done too soon, and if it is deferred till the time of planting, they are apt to rot.

If the young tubers or offsets are planted in October, in similar soil to that before recommended, they will frequently flower the ensuing year, when they may be treated in the same manner as the old tubers. Seed may be sown as soon as it is ripe, in tubs or boxes, in a loamy soil, and covered very slightly with light earth; the boxes will require a trifling protection during the winter, and in the spring they should be plunged their whole depth in soil, and the plants should be well watered during the summer, if requisite. As soon as the leaves begin to wither, water should be gradually withheld; and the tubers may be taken up when the foliage is sufficiently decayed, and subsequently treated as the old plants. New varieties may be obtained by uregating the pistil of one flower with the pollen of

another of a different sort, and, after carefully preserving the seed, sowing it as before recommended.

Dahlias are likewise tuberous-rooted, but their treatment differs essentially from those last considered. Of all florists' flowers, these are, perhaps, the most popular, and every one who is acquainted with them, will at once admit that they are deservedly so. They are cultivated with such great ease, and the greater part of them may be procured at such a very trifling cost, that they may with propriety be termed "the cottager's flowers." Many florists, however, annually incur great expense and trouble in the cultivation of these plants; but, as it is presumed that few of the readers of this little work possess the convenience of frames or fermenting materials, the usual mode of cultivating them will not here be detailed; and we shall endeavour to sketch out a system, which will be found simple and economical, as well as efficacious.

Dahlias may be multiplied either by seeds, by cuttings, or by dividing the roots. The former of these methods is only employed for the purpose of raising new varieties, and the seeds should be saved from the best sorts, plucked on a dry day, and carefully rubbed out of the heads, to be preserved through the winter in a dry drawer or other place. About the month of March the seeds should be sown in boxes, pans, or pots, in a light loamy soil, and kept in the window of a dwelling-room, with due attention to watering when required. When the young plants have formed three or four leaves, they may be planted out at three or four inches from each other in a warm border, and sheltered in cold weather and at night by placing a garden-pot over each in an inverted position. As soon as the season is sufficiently advanced, they should be taken up carefully, with balls of earth to the roots, and planted in an exposed situation, at two or three feet from each other either way, where they may be treated as hereafter directed for the old sorts. When they show their flowers, the sorts that are considered worthy of preservation should be marked, and the single or worthless ones at once thrown away.

Old and established sorts may either be propagated by division of the roots, or by cuttings. The method of multiplying them, by dividing the roots, is the easiest and most

simple ; but those plants which have been raised from cuttings generally flower best. Both are performed in the spring, and at the time the plants commence growing ; but they are, of course, conducted in a different manner. In the latter end of April, or the beginning of May, the roots should be taken from their winter quarters, and having carefully examined them to see that the eyes or crowns are sound, they should be planted in a warm border with a south aspect, and in a very light loose soil, such as leaf-soil or old bark. The crowns should be buried about an inch beneath the surface of the soil, and if any frost occurs, a little dry straw or litter should be thrown over them during the night. When the shoots have grown about an inch above the surface of the soil, if the roots are to be divided, they should be taken from the soil, and separated into as many pieces as there are shoots, provided that a good tuber can be obtained to each plant. The divisions may then be planted separately in the border, where they are required to flower, and when they are sufficiently established, all the shoots should be removed but one, that is, if there happen to be more than one, and the plants may be protected in the same manner as directed for seedlings, if any frosts occur. If, however, the plants are intended to be propagated by cuttings, (which is the best, though not the safest method,) as soon as the shoots have attained the height of two inches above the ground, the soil should be carefully removed down to the crown of the roots, and the young shoots taken off with a knife, along with a small portion of the crown of the plant. They should then be immediately potted singly into small pots, in a light loamy soil, and taken to the window of a dwelling-room ; a little water should be given them at the time of potting, and also afterwards, when required ; and they should not be exposed to the rays of the sun till after they have been potted a week, and then only by degrees. When the plants have become sufficiently rooted, they should be planted out in the borders, and protected, if necessary, as before recommended.

In planting, the roots should be placed full three inches beneath the surface of the soil, and they should be planted in a loamy soil, that is neither too poor nor too rich, as

well as in a very exposed situation, and on no account beneath the shade of trees. After planting, they should be watered when necessary, and staked as soon as possible, as the succeeding beauty of the plants depends much upon staking them sufficiently early. It will be safer to invert a flower-pot over each plant every night for two or three weeks after they are planted, to protect them at once from casual frosts, and from snails and slugs. They are very liable to be eaten by the latter, and should be examined frequently and with care. If large flowers are desired, the plants should be slightly pruned, always taking off the shoots that are to be removed as soon as they appear, and not allowing them to grow to any size before they are detached. But, if a great abundance of flowers is wished for, no pruning will be necessary, and all the attention the plants will require, is to keep them properly secured to the stakes with garden matting, and hang a few small tubes on various parts of the plant, for the purpose of catching earwigs, which are very destructive to the flowers. If the summer is very dry, a mulching of cow-dung may be placed round the base of the stems of the plants, which will keep the roots cool and moist. The roots should be taken from the soil on the first appearance of frost, having previously cut down the stems to within a few inches of the ground. They must be gradually and thoroughly dried, and after this has been properly effected, and all the soil carefully detached from them, each root should have a wooden label attached to it with wire, on which some mark should be made by which the grower will know what sorts they are, and their height and colour ; and they may then be placed away for the winter in a cellar or store-room, and kept as dry as possible by covering them with an abundance of dry straw, but not allowing the apartment to become too warm or they will either grow or shrivel. Dry sand is an excellent medium in which to pack them for the winter. In the spring they may be taken out for propagation, and otherwise treated as before directed, always taking care to keep them perfectly dry during the winter, and also to preserve them effectually from frost, and keep the sorts distinct.

Heartseases or pansies are no less interesting to the

cottageer than dahlias, and are equally within his means, while they occupy less room. They are nearly all of very easy culture; but to have them fine, they require much attention. An increase is effected by seeds, cuttings, or layers; by the former method, new varieties may be obtained, and by the two latter, old sorts are perpetuated. Many writers on the subject have entered into very lengthened details with regard to the cultivation of these plants, but of course only a very brief outline can be given here. Where new varieties are desired, the seed should be collected from the first-ripened pods of the best sorts, and sown thinly as soon as it is ripe, in a shaded situation, and a light loamy soil. As soon as they have formed a few leaves, they should be transplanted into a similar border or bed, at about four inches apart, when they may be afterwards treated as the old plants. To propagate the old varieties, some consideration is necessary as to whether they are strictly perennial, or only partially so, for those sorts which are purely perennial may be propagated with facility by cuttings, while those which are not so, require to be multiplied by layers. Either of these methods may be practised at any time, but if done in the spring months, or early in the autumn, the greatest success will be ensured. There is a method, however, of dividing the roots, which is much more certain than either of those just alluded to. The plants are taken from the soil in dull weather, and divided into as many portions as the roots will allow, taking care to have a few root-fibres to each division; they are then planted separately in a shady border, and well watered till they have become settled in the new soil. This system is recommended when the plants grow too straggling, and, with those sorts which are capable of being thus treated, is doubtless the most efficacious mode of propagation. Those sorts which require layering, may be subjected to this operation either late in the spring, or early in the autumn, and it is a very simple method, as all that is required is to lay down the young shoots into the soil, and make a slight incision at the joint which is buried deepest in the ground. They will soon strike root, and may then be carefully detached, and managed as the old plants. Where a great number of plants is required, the best method

of obtaining these is by cuttings, which, in the perennial sorts, will strike very readily if properly managed. The advantage of this method is, that only the tops of the plants are taken off, and the base of the stems and roots will soon produce fresh shoots ; besides which, plants raised from cuttings are generally superior in every respect to those obtained from division of the roots or layers. The best time for practising this method is said to be late in the spring, or early in the autumn, but not during the summer months. The cuttings should be taken from the extremities of the young shoots, and should be cut off just below the third or fourth joint from the top, removing the leaves from the part that is to be inserted in the soil. They should be planted an inch or two apart in a sheltered border, and in a rather rich loamy soil that has been previously well watered, covering them with a hand-glass, and shading this with some thin material for a few days after planting, if the sun should shine upon them. When they are free from danger on this score, the hand-glass should be removed by degrees, to admit light and air ; and as soon as the cuttings are struck, they may be planted out in a similar situation, and treated as hereafter directed.

Heartseases require a rather rich loamy soil, but it is of much greater importance that they be not allowed to remain in the same soil more than one year, as they are considered to be great deteriorators of the soil. On this account, also, cultivators never remove heartseases with balls of earth ; but, on the contrary, when they are transplanted, the soil is taken from the roots, and these latter are carefully washed for the purpose of removing all the old soil which attaches itself to the roots. This is considered of great importance by some ; but it may be doubted whether it is not, after all, a very unsafe and inexpedient practice. A cool and rather shaded situation is also recommended as most suitable, and therefore they should never be planted in a bed or border where they will be much exposed to the sun, which weakens the plants, and also the blooms, and causes the colours of the latter to sport. A rich moist soil will be preferable to much shade ; and care should be taken to have the plants removed at such a season, that they get well established, and their roots amply protected

by the branches and leaves, before dry weather generally occurs. A small bed of heartseases, in which the sorts are well arranged according to their various colours, has a most interesting and imposing appearance when the whole are in flower ; and if the soil and situation are suitable, it will present to the eye one dense mass of blossoms. When the shoots grow too high, or too straggling, it is a good plan to place a little soil on the lower extremity of them, and slightly press them down to the earth, which will much invigorate them, and cause them to throw out new roots.

7.—*Plants in Pots.*

There is no class of plants which can be cultivated by the cottager, that is so injudiciously treated, or so badly grown, as those which come within the limits of this article ; and yet there is, perhaps, none which is more generally interesting. Nearly every person possessing a house of any description, appears emulous of obtaining and cultivating a few plants in pots ; but, being very generally ignorant of the manner in which they should be managed, they are seldom seen in a healthy or flourishing condition, and still less frequently are they grown in the perfection to which they are capable of being brought by proper and judicious cultivation and management. Nor is this deficiency more attributable to ignorance than inattention or prejudice ; for many persons consider that, if they place their plants in pots in some way or other, and keep them constantly watered, they cannot fail to thrive ; but a more erroneous conclusion could not possibly be come to, for the operation of potting, and the application of water, require to be conducted with the greatest possible nicety and discrimination, and it is chiefly to the improper manner in which these are performed, that all the ill-success in the cultivation of these plants may be ascribed. In the following remarks, a general system of cultivation will be detailed, by which the poorest individual may be able to manage a number of these plants, and which will also be found useful to persons of more ample means, who are neither possessed of a greenhouse, nor are able to employ a gardener. Previous to entering upon the subject of cultivation, it may be well

to supply a brief list of such plants of this description as are adapted to the gardens and means of the persons for whom this little work is intended, arranging them only according to the time of flowering.

SELECT LIST OF TENDER PLANTS, THAT REQUIRE TO BE GROWN IN POTS.

Many species of Fig Marigold, or *Mesembryanthemum*. Fl. at all seasons. Various colours.

Many species of Heath, or *Erica*. Fl. at different seasons. Various colours.

Japan Camellia, and varieties (*Camellia Japonica, et var.*). Fl. in March. Various colours.

Conical Fuchsia (*Fuchsia conica*). Fl. in May. Scarlet.

Small-leaved Fuchsia (*F. microphylla*). Fl. in May. Crimson.

Globe Fuchsia (*F. globosa*). Fl. in May. Scarlet.

Garden varieties of Geranium (*Pelargoniums*). Fl. in May. Various colours.

Acute-leaved Alonsoa (*Alonsoa acutifolia*). Fl. in May. Scarlet.

Poplar-leaved Cineraria (*Cineraria populifolia*). Fl. in May. Purple.

Peruvian Heliotrope (*Heliotropium Peruvianum*). Fl. in May. Purple.

Scarlet Fuchsia (*Fuchsia coccinea*). Fl. in May. Scarlet.

Slender Fuchsia (*F. gracilis*). Fl. in May. Scarlet.

Many species and varieties of *Fuchsia*. Fl. in May and June. Various colours.

Imbricated Fabiana (*Fabiana imbricata*). Fl. in May and June. White.

Ivy-leaved Geranium (*Pelargonium lateripes*). Fl. from May to August. Pink.

Many species and varieties of *Cineraria*. Fl. in May. Various colours.

Many species and varieties of Slipper Wort, or *Calceolaria*. Fl. in May. Various colours.

Showy Cactus (*Cactus speciosus*). Fl. in May. Pink.

Most Showy Cactus (*C. speciosissimus*). Fl. in June. Crimson.

Lemon-scented Aloysia (*Aloysia citriodora*). Fl. in June. Purple.

Garden Hydrangea (*Hydrangea hortensis*). Fl. in June. Pink.

Discoloured Begonia (*Begonia discolor*). Fl. in June. Pink.

Sellow's Lantana (*Lantana Sellowii*). Fl. in June. Purple.

Several species and varieties of Monkey-flower, or *Mimulus*. Fl. in July. Various colours.

Many species of *Cactus*. Fl. in July. Various colours.

Canary Balm of Gilead (*Dracocephalum Canariense*). Fl. in July. Pale purple.

Entire-leaved Slipper Wort (*Calceolaria integrifolia*). Fl. in August. Yellow.

Many varieties of *Lobelia*. Fl. in July and August. Various colours.

The Erinus (*Lobelia Erinus, et var.*). Fl. in June and September. Blue.

Many varieties of *Verbena*. Fl. from July to October. Various colours.

Many varieties of *Petunia*. FL. from July to October. Various colours.

Common Myrtle (*Myrtus communis*). FL. in August. White.

To this list many other beautiful plants might doubtless be added ; but we presume those here enumerated will be sufficient for any person who does not possess a greenhouse ; and it should be observed, that, in this, as well as all preceding lists, the time of flowering that is stated, refers to the time the flowers commence expanding, and many of them continue flowering for several months.

In cultivating plants in pots, a great diversity of treatment is required ; nevertheless, there are some general principles which apply to all, and which we shall here state ; after which, a few of the more extensive and important tribes will be briefly treated of more particularly. In the management of plants of this description, one of the most important features is to allow them as much light as possible ; and, as a due proportion of this can never be obtained in the window of a dwelling-room, the plants will never thrive unless they are placed in the open air, as frequently as the weather will permit. Air is also requisite, but by no means so much so as light, though many gardeners mistakenly ascribe the effects of light to air. This is a popular error, and it should be borne in mind that the more light which can be afforded to most plants of this description, the larger, finer, and more numerous, will be the flowers they produce ; although, upon principles before stated, they should not be much exposed to light during the time the flowers are expanded, as all flowers will continue much longer when partially shaded. During the flowering season, however, it must not be understood that these plants are to receive no light, but merely that they should be excluded from the bright rays of the sun, as they cannot be too much exposed to light, even at this period of their growth, when the sun is not shining.

Equal in importance to exposing them fully to light, is the manner in which they are potted, and this is a subject which is too generally overlooked by cottagers and others, to the great injury of their plants. Judicious potting is an art in which few practical gardeners excel, or even conduct

in a proper manner, and it is not therefore surprising that uninitiated persons should be incapable of performing it skilfully. Proper drainage is one of the prominent features in this operation, and instead of (as is usually done) only placing a single piece of tile, broken pot, or oyster shell, over the hole in the bottom of the pot, there should be at least an inch in depth of draining materials in the bottom of a moderate-sized pot. A rounded (not flattened) oyster-shell, or a piece of tile of a similar construction, should be placed over the hole in the bottom of the pot,—taking care previously to wipe the inside of the pot perfectly clean, if it has been before used,—and over this oyster-shell a quantity of pieces of brick, cinders, tiles, or broken pots, about half an inch square, should be placed to the depth of half an inch, or an inch, breaking those at the top smaller than the bottom pieces. Previous to potting the plants, the soil should be prepared, and well incorporated by frequently turning it over with a spade. It must be varied to suit the constitution of particular plants, but as this will be hereafter noticed, we shall not now allude to the quality of the soil, but merely state, that having previously prepared it, and also the pots for the reception of the plants, a little soil should be placed over the drainage materials in the bottom of the pots, to prevent the roots from resting on them, and the plant intended to be potted may then be taken out of the old pot, which may be done by tapping the edge of the pot on a board or other solid material, having the fingers placed across the pot, with the stem of the plant between them, to receive it as it comes out of the pot. The drainage materials should then be carefully removed from the bottom of the old soil, and if the roots are very numerous, and much matted round the edge of the ball of soil, they may receive a few gentle taps with the hand to loosen them a little. If the ball of soil is very hard and firm, it will be better to remove the greater part of it with care, and place the plant entirely in fresh soil.

In potting any plant, the pot in which it is to be placed should be just one size larger than the one previously used, and the plant should be placed in the centre of the pot, and at such a depth as will allow the old ball of soil

to be covered slightly with the fresh earth, so as to fill the pot to within half an inch or less of the top. The soil should be placed carefully around the old ball, and a small flat stick should be used for the purpose of pressing it down round the edges of the pot, so that there may be no cavities in which water can collect and injure the roots. When the pot is filled with soil, the bottom should be struck flatly on a table or stone, which will have the effect of settling the soil about the roots, and reducing the surface of it to a level; the plants may then be well watered from the fine rose of a small watering-pot, and slightly shaded, for a few days, till they have become established in the soil. These remarks apply only to such plants as are growing vigorously, and whose roots require to be shifted into larger pots for the purpose of extending themselves. But there will too frequently be found plants, which, from injudicious potting, and too large a supply of water, have been brought into such an unhealthy condition, that their roots, instead of extending themselves, have become contracted by disease. The cause of this may always be traced to the pots having been insufficiently drained, and watered too abundantly; and when this is found to be the case, the plants should be taken from the pots, the soil carefully removed from their roots, and potted into fresh soil in pots of a smaller size, than those which they previously occupied.

Whatever advantages may be derived from good potting, these will be all counteracted if the plants are not watered attentively and cautiously; as either too much or too little water would be highly injurious to them. The prevailing error in watering these plants, is to apply water to the whole collection at the same time, and in equal quantities, whether they require it or not; and, certainly, a system more calculated to injure or destroy all the plants that are subjected to such treatment cannot well be imagined. Indeed, where such a system is practised, (which is too generally the case,) instead of it being strange and unaccountable that the plants never thrive well, it is a matter of surprise that they exist at all, under such treatment. If a man, possessing a family of children of different ages, sizes, and capacities for receiving and digesting food, were

to apportion a certain quantity of food to each of those children, and compel them all to eat the portion allotted to them, his conduct would be denounced as irrational and cruel, and the health of some of the children would suffer from an insufficient quantity of food, while that of others would be equally, or much more injured, by receiving more than was necessary for them, or than they were able to digest. But, perhaps, the individual who denounced such a mode of proceeding, might possess an equal number of plants, the habits of which might be still more diverse, and the circumstances in which they were placed, might render such treatment much more prejudicial to them ; and yet, such an individual would probably administer to them all an equal quantity of food, (water,) without considering that the results would be precisely the same as in the case of the children, and that such treatment must promote disease, and, perhaps, ultimately cause death. These cases bear the most perfect and striking analogy to each other ; and the inference naturally follows that all plants, but more especially plants in pots, should be watered whenever they may require it, and only then. The best criterion for performing this operation is, when the surface of the soil in the pots appears dry, which, if the plants have been properly potted, may be safely depended upon. Saucers or flats should never be employed for the purpose of containing water, as it is always best to apply water to the surface of the soil, and when these are used for cleanliness, the water which drains through the pot into them should always be thrown away, as soon as it is perceived. If plants in pots are ever permitted to become too dry, the soil frequently separates itself from the edges of the pot, and it will be of no avail whatever to water the plant, until the soil is pressed closely down to the edges of the pot, as the water would escape through the cavity thus formed, without being of any advantage to the roots. If plants of this description are left out in the open air all night during the summer months, they will derive much benefit from the dews which fall at this season, and it will be useful to them occasionally to water them over the leaves and branches in the evening of a summer's day, or what is much better,

to syringe them with water over the leaves and branches. This will tend to invigorate the plants, and also wash off any filth that may have accumulated on the leaves, which is highly injurious. Many plants which cannot be kept clean in this manner, should have their leaves occasionally sponged with clean water. During winter, plants will need very little water indeed, especially as a wet state renders them more liable to be injured by frost. But when they are watered, it should be done so as to wet the entire mass of soil, and not merely the surface of it, or they will not be at all benefited by the application.

The principles thus detailed are applicable to all kinds of plants of this description, but the treatment which some of the sorts require is so peculiar, that it will be necessary briefly to notice it here. Geraniums (or more properly pelargoniums) are such universal favourites, that they demand the first consideration, and the mode of treatment we are about to recommend for them, will, we are persuaded, be found to save much trouble, and be worthy of general adoption among the classes for whom it is intended. These plants are usually kept in pots throughout the whole season, and, as few cottagers are enabled to purchase pots of a size sufficient to grow the plants to perfection in, they are but rarely seen producing their flowers so large and so abundantly as they would, if the roots were not too much confined, and had sufficient room to extend themselves. To obviate this evil, we propose that the plants should be turned out into the open border in the spring, after all danger from frost is over ; where, if the earth in the border is prepared for their reception, and is composed of light loamy soil, and a small portion of well-rotted manure, they will flower in great perfection during the summer months, and there will be no danger of their being injured by the bad potting, or injudicious watering, to which they are liable when kept in pots. If it be urged that this system is only applicable to the common and inferior sorts, we reply, that it may be practised with advantage with all the sorts that can be procured by the classes for whom this is written. We have practised this system with the most perfect success, and have not the slightest doubt of its practical utility. Plants thus treated will grow in the

richest luxuriance, and continue flowering during the whole of the summer. But, as they cannot be retained in this situation all the winter, it is obvious that some means must be devised for preserving them through this period, and these means we shall now detail.

To take up the old plants, and place them in pots for the purpose of keeping them through the winter in a dwelling-room, would, besides greatly injuring them, require as large, or even larger pots, than if they had been constantly kept in pots; besides which, as it is well known that young plants flower best, and occupy much less room, a quantity of cuttings should be struck early in the autumn, according to the directions given under the head of cuttings, in a former part of this little work; and these, when rooted, should be potted into small pots, and kept as much as possible in the open air, preserving them in frosty weather in the window of a dwelling-room during the day, and in a somewhat more secure situation at night. In the spring they will be fit for planting again into the borders, and by this means a constant succession may be obtained, leaving the old plants to perish. If any are desired to be kept in pots, after they have ceased flowering, their stems should be cut down to within an inch or two of the main stem, and the shoots made into cuttings. The old plants should then be repotted, and kept through the winter as before directed, taking care not to water them unless they require it, and never watering them over the leaves at this season.

The same system of treatment may be advantageously adopted with heliotropes, alonsoas, fuchsias, shrubby calceolarias, and all other plants of similar habits, except that none of these require so much pruning as geraniums, and they may be conveniently kept in pots throughout the whole season if desired, adding to the soil in which they are potted a little peat or heath-soil, and a small portion of white sand. The various species of heath, though very ornamental, require great care and attention to grow them successfully, and are not well adapted for cottage gardens or windows. They must be potted in sandy peat, or heath-soil, with a slight addition of light sandy loam; and some small pieces of soft grit-stone should be mingled

with the soil to promote drainage. They will not succeed well when turned out in the open border in the summer months, as the operation of removing them to pots in the autumn would injure them; they should, therefore, be kept in the window of a dwelling-room, and placed in the open air in the summer months, removing them to a shaded situation when the heat of the sun is very powerful. Great care and attention is necessary in watering them, as they are very liable to perish when supplied with too much or too little water. They are propagated with difficulty by cuttings, which are so extremely delicate that few cottagers need attempt this operation, as they will seldom succeed without great attention.

Camellias are much more ornamental than heaths, but, with the treatment which cottagers are enabled to afford them, they are very liable to shed their flowers when in the bud state, without ever expanding. This unfortunate circumstance is caused, in a great measure, by the variations of temperature to which they are subjected while the flower-buds are forming, and partly by either a lack or superfluity of water at this season. To obviate this, it is necessary to pay particular attention to them after they have ceased flowering, and during the growing season, at which time the flower-buds are usually formed. As soon as their flowers have fallen, they should be potted into larger pots, as they may respectively require, in a compost comprised of one-half sandy loam, one-fourth peat or heath soil, and the rest of well-rotted manure, or leaf-mould, and white sand. After being potted, they should be placed in the window of a dwelling-room, where a fire is usually kept, and watered with great care, never allowing them to become too dry or too wet. As long as they continue growing, and until the flower-buds are properly formed, they should remain in the situation above alluded to, and never be removed to the open air. They should be allowed as much light as can be afforded them, without permitting the sun to shine directly upon them, which latter circumstance should be avoided throughout the whole period of their growth, as camellias cannot endure the immediate rays of the sun without being injured. When their growth is completed, and the flower-

buds perfectly formed, the plants may be removed to the open air in a shaded (not exposed) situation, but they must be retained in the pots, and removed again to the window of a dwelling-room upon the first appearance of frost. From this time till the period of flowering, particular attention should be paid to watering them carefully, and if this operation is properly and judiciously performed, they will never shed their flowers, unless they are allowed to be injured by frost, or too severe cold. Throughout the growing season, the leaves and branches should be frequently sprinkled or syringed with water, and the leaves should also be sponged as often as dust or filth accumulates on them. The best mode of propagating them is by inarching, which must be performed by an experienced gardener. Some of the common sorts are considered almost hardy, but they seldom flower well in the open ground.

The *Begonia discolor* or *Evansiana* is frequently grown in cottage windows, where it is a most delightful ornament. Its treatment is very simple, though peculiar, as it requires to be kept in a perfectly dormant state through the winter. As soon as the stem and leaves begin to decay, water should be withheld, and the pot containing the plant should be placed in a dry cupboard, where it will be secure from frost. Early in the spring the plants should be taken from their winter-quarters, and repotted into a rich loamy soil; after which, they must be most liberally watered, as this plant requires a large supply of this element. The practice of watering this plant, by allowing it to draw up moisture from a saucer or flat, is not a good one, and it is much better to supply it with water, by applying it to the surface of the soil. After flowering, watering should be gradually suspended, and the plant treated as before recommended.

The various species of monkey-flower require to be kept in pots through the winter season, but they may be planted out in the open border in the summer months, where they will grow much more vigorously, and flower in greater perfection. The mode of propagation is, simply, to place a little soil on the younger shoots, which will speedily form roots, and may then be removed into pots in any rich soil.

During the winter months, they should have as much air and light as possible, but especially the latter, and they must be watered with great caution, taking care never to wet the leaves, or to allow them to become wet from any cause, which would cause the whole plant to rot. When all danger from frost is over, they may be planted out in the open borders, to remain there all the summer, and again be propagated in a similar manner in the autumn. These remarks apply equally well to the beautiful Scarlet Vervain, (*Verbena melindres*), the species and varieties of *Petunia*, and others which are not perfectly hardy ; except that the latter are not so easily increased, and must generally be propagated by cuttings of the young shoots taken off early in the autumn. The same care is necessary in preserving them from damp, and exposing them as much as possible to light, which latter is of first importance, as, in the absence of a due degree of light, such plants are rendered more susceptible of injury from cold and damp. They do not require any artificial heat, but merely to be effectually secured from frost, and, except in very severe weather, the window of a dwelling-room is not so good a situation for them as that of a bed-room, or other cooler apartment ; for, when placed in too warm a room they grow too rapidly, and, consequently, in too weak and slender a manner. The musk plant, though a species of *Mimulus*, is quite hardy, and will thrive in any moderately good and moist garden soil. If grown in pots, it need not be protected in winter. The pots should, however, be plunged in the ground at that season up to the rim.

Hydrangeas are of very easy culture, and may even be grown in the open air, but, when kept in pots, they are highly ornamental. Cuttings of the young shoots will strike under a hand-glass, if taken off in the month of May, and planted in a light sandy soil ; but if a little artificial heat is at command, they will succeed much better. As soon as they are rooted, they should be potted singly into small well-drained pots, and kept in a shaded situation till they are well established, after which, they may be removed to a place where they will be fully exposed to the sun, and repotted, when they require it, into larger pots. The soil most suitable for them is maiden loam taken

from a field or common, enriched by leaf soil or well-rotted manure ; and during the whole period of their growth, if they are judiciously potted, it will be almost impossible to give them too much water, as, in hot weather, they will frequently require watering three times in a day. If well exposed to the sun during the autumnal months, they may be kept through the winter in cellars, with little or no water ; but they must be taken from this situation early in the spring, and after being potted into pots of such a size as the plants may require, removing as much of the old earth as possible without injuring the roots, they should be placed in the window of a dwelling-room, and be well supplied with water at the roots, as well as the leaves and branches frequently sprinkled with it. With old plants, all the shoots should be cleared away as soon as they commence growing, except four or six of the strongest, which will cause them to flower in much greater perfection, and will also render the colours of the flowers much richer and more brilliant.

Succulent plants, such as the various species of *Cactus*, and others which resemble them in appearance and habit, are very interesting, and by no means difficult to cultivate, though in cottage collections they rarely flower in perfection ; a circumstance almost entirely owing to the insufficiency of light with which they are supplied. We shall not here detail the means employed for propagating these plants, but merely state that they may be multiplied by grafting, by cuttings, and by seeds ; but artificial heat is almost essential to ensure success in this operation, therefore they cannot be readily increased by the classes for whom these directions are written. Soil is an important particular in their cultivation, and this should be composed of one-half light sandy loam, one-fourth of leaf mould, or other light rich soil, and the remaining fourth of lime rubbish broken fine, and white or river sand. The plants should be potted after they have ceased flowering, or after the time at which they ought to have flowered, in a compost of the above description, and in pots of a rather small size, as many of them have but few roots. They should be well supplied with water while they are in a growing state, both at the roots and over the leaves or stems, and kept in

the window of a dwelling-room till they have ceased growing, always affording them as much light as possible. When the growing season is over, they should be removed to the open air, in an exposed situation, and only allowed a sufficient quantity of water to prevent them from shrivelling. In this situation they should be kept till frosty nights occur, when they may be taken to the window of a dwelling-room, and retained there during the winter, placing them in the open air in favourable weather, and watering them with the greatest possible caution. Early in the spring, the soil in the pots may be slightly stirred on the surface with a fork, and a little fresh soil added ; after this, the plants should be rather more liberally watered, and where they have been properly exposed to light during the summer months, they will almost invariably flower. They should be repotted as soon as the flowers have faded, and otherwise treated as before directed.

The various species of fig-marigold will thrive well if planted out in an exposed border during the summer months, and taken up and potted again in the autumn ; or, the pots in which they are growing may be plunged in the soil of a bed or border in the open ground, removing them to a dwelling-room on the approach of winter.

Balsams, cockscombs, and other tender annual plants, may be grown successfully in pots if desired, and, with a little attention, will be highly interesting and ornamental. They may be sown in pots or boxes of loamy soil, which may be kept in the window of a dwelling-room, but will succeed better if a little dung heat can be procured, and covered with a hand-glass or frame. As soon as the young plants have formed two leaves, besides the seed leaves, they should be potted into small pots in a rich loamy soil, and either one, two, or three plants may be placed in each pot, according as the individual may possess room to place the pots in a light situation. Any tender annuals, besides balsams or cockscombs, may be planted three in a pot, and all the attention they will afterwards require is to be shifted into larger pots and liberally watered. Balsams, however, and cockscombs, should be planted singly into small pots, and they will require to be very frequently potted into larger pots, using

pots of only one size larger at each shift, and never potting them into large pots at once, as is frequently done for the purpose of saving trouble. They require to be kept as near as possible to the light ; and where only side light is afforded, they should be frequently turned to prevent them from growing deformed and unsightly. They also require to be largely supplied with water, and in fine weather they should be exposed to the open air ; water should be applied over the leaves and branches, as well as to the roots, but the former of these operations must always be performed in the evening of the day.

Bulbs, such as some species of amaryllis, that require to be grown in pots, may be treated as has been before recommended for hyacinths, except that they must be allowed to commence growing naturally, and not be stimulated by being plunged into some light soil. They must be abundantly watered during the growing and flowering season, but the quantity of water applied to them should be gradually diminished after their flowers have faded, ultimately withholding it entirely, and removing the bulbs from the soil, to be kept dry till the autumn, when they must be again planted. If the bulbs are not thus annually removed from the soil, and the offsets detached, they will never flower in perfection, and frequently will not flower at all.

A good deal of variety and pleasure may be created by suspending one or two potted plants, of trailing habits, from the ceiling of a living-room, near the window. The *Saxifraga oppositifolia*, with its pendulous runners, on which are numerous tufts of leaves and roots, is both curious and beautiful, and singularly adapted for such treatment. The ivy-leaved geranium is equally characteristic and good. Several of the fig-marigolds, with slender drooping stems, will likewise look well in such a position. Any low-growing climber, if left untrained, will be singularly effective. And the pretty trailing verbenas will appear quite at home. The last plant we shall mention, and one of the best for the purpose, is the elegant little ivy-leaved toadflax, (*Linaria Cymbalaria*), often found on old walls and ruins, but fully worthy of cultivation, as it is nearly always in bloom.

Having thus briefly stated a few of the principles upon which the successful cultivation of most flowers that require to be kept in pots, and to which a glass structure is not essential, depends, it only remains to observe, that the window of a room in which plants are kept, should always, if possible, face the south or south-west, and the nearer its aspect approaches to these points, the greater success will be attained in the cultivation of any plant. It is also necessary to remark, that, when plants in pots are placed in the open air, there should always be some boards, slates, tiles, coal-ashes, or other similar materials, placed beneath the pots, to prevent worms from entering them, or the holes in the bottom of them being clogged up with soil. For this reason, a small wooden stage is of great advantage, and, whenever it can be procured, should always be made use of for this purpose, particularly as it is well calculated to exhibit the flowers to the greatest advantage. Such a stage, however, when employed, should never be placed exactly facing the south, not only on account of preserving the plants much longer in flower, but also because the heat of the sun would penetrate the pots, and greatly injure the roots. A south-west aspect is therefore far preferable, at least during the summer months; and when the plants are watered, it will be an advantage to them to wet the pots as well as the soil, in very hot weather.

IV.—GARDENING SOCIETIES.

Mr. Menteath strongly advocates the formation of district societies, to promote a taste for gardening among cottagers and mechanics, awarding prizes of seeds, implements, and the like, to the most successful cultivators. Such societies have been formed in many counties, and are now pretty numerous, but by no means so general as they might and should be. Nothing could be more desirable than the extension of such societies, as the moral influence which they exercise over the individuals forming them can scarcely be conceived unless it has been witnessed. In connexion with the allotment system, they furnish the most admirable means of moral renovation.

Not only are habits of industry and sobriety thus formed

and cherished, but, as a consequence from these, unity, happiness, and comfort, are introduced into the domestic circle; sociality of disposition, and genuine kindness of heart are engendered; and the cottagers of Britain attain to that state of moral culture which the wealthier classes cannot but admire, and of domestic peace which many of them might envy. We earnestly recommend all those who are desirous of promoting such a state of things, to further with their sanction and support the formation of Gardening Societies.

D. CALENDAR OF GARDEN WORK.

It may be proper to remark that the times to be now stated for sowing and other processes, are averaged chiefly for the north of England and the south of Scotland, and must be modified also according to circumstances or situation. In a low situation, for instance, on the side of a river, vegetation will usually be a week or more later than on a slope above it facing the south-west.

I. JANUARY.

Though continued frost is rather an exception than the usual rule of our climate, we have now more frost than in any other month; and the old saying is quite correct, that "as the day begins to lengthen the frost begins to strengthen;"—at least so far as this month is concerned.

1.—*Kitchen Garden.*

Trench vacant ground in open weather, and throw it into ridges neatly by line. When frost sets in, if it be very severe, cover with straw, fern, or long dung, parsley, winter lettuces, and the ground over rhubarb. Destroy any slugs or snails which are observed:—one killed now will prevent the breeding of a dozen or two in spring.

In open weather, sow Bath, black seeded gotte, and cabbage, lettuce; horn carrots, radishes, and Flanders spinach, may also be sown, though at the risk of losing them if they

be not well protected with straw. Also mazagan and long-pod beans. Plant out early York cabbages to succeed those of the October planting.

2.—*Fruit.*

Scare birds from picking the fruit-buds ; and search for the eggs of insects, particularly those small grey patches which encircle the branches of apple and other trees, all of which contain the rudiments of swarms of insects, and which, if now destroyed, will save much trouble, as well as much injury to the trees, in the ensuing spring. If ornamental and fruit trees and shrubs have not been previously pruned, this operation should now be performed, and the mildest days should be selected for this purpose. They should also be trained, if necessary, at the same time.

3.—*Flowers.*

Tulips and other bulbs, on coming through the ground, ought to be sheltered, in very severe weather, with the same materials which are recommended for parsley, &c. in the preceding page. Any other border flowers that require shelter, should be treated in the same manner, though this precaution is seldom necessary.

Do not give much water to plants in pots, and especially avoid wetting the leaves. They should be closely housed at this season, but must be kept as near as possible to the light during the day.

II. FEBRUARY.

Rather more than one third of the nights in this month are usually frosty ; but the average heat of the weather is two degrees higher than that of last month, and would be more, were the sky more cloudy.

1.—*Kitchen Garden.*

In open weather, early potatoes, such as the ash-leaved kidney, cut with single eyes, may be planted, though at the risk of losing them if not carefully protected with hoops and mats, or straw ; but radishes, which may be sown over, and round spinach between, the potato drills, will endure severer weather and come in early. About the middle of

the month, sow the first crops of savoys, leeks, onions, and lettuce, peas, beans, horn carrots, and early York and Vanack cabbages for succession. Winter lettuces may be thinned out, and cabbages, potato onions, chives, shallots, and horse-radish, planted.

2.—*Fruits.*

Grafting may be begun about the end of the month. In the south, the young shoots of vines, which are produced near the base of the stem, may be laid down into the soil ; and if they are slightly twisted so as to crack the bark, they will form good roots during the following summer.

3.—*Flowers.*

Clear off, in every fine day, the mats or straw used to protect tulips and other flower-roots. It is still rather early to sow any but the hardier annuals, except in well-sheltered borders, or in pans in the window of a dwelling-room. Plants in pots should have a few hours of sunshine out of doors each day when the weather will permit. Auriculas and a few other potted plants should have an inch or two of the old earth taken from the surface, and some fresh soil substituted for it.

III. MARCH.

The average heat of the weather rises six degrees this month, and it is besides usually dry ; an excellent ordering of Providence for seed-sowing ; for, according to the old proverb, founded on correct experience, “a bushel of March dust is worth a king’s ransom.” The milder days are best for sowing.

1.—*Kitchen Garden.*

Before sowing, dig carefully, and make the ground level, even, and fine, and after sowing, scare sparrows and chaffinches. Main crops may be sown soon in the month, such as early long-pod beans, peas, onions, leeks, parsley, celery, carrots, parsneps, cabbages, savoys, Dutch turnips, and indeed most other vegetables, as already directed. Mustard, cress, lettuce, spinach, and radishes, may be sown every week, or fortnight, for succession, and some mustard for seed. Sow New Zealand spinach in a pot in-doors. Chives,

shallots, and garlic, may be planted, as well as small onions grown under trees last season, and large ones for seed ; plant rhubarb, potatoes, and Jerusalem artichokes. Cuttings or slips of sweet herbs may be planted. Transplant cabbages and lettuce.

2.—*Fruits.*

This is the main season for grafting ; and towards the end of the month for layering. Trees may also be transplanted now, but, for most sorts, November is the best month for performing this operation. Dress strawberry beds, and, if not done in autumn, plant new beds, if required.

3.—*Flowers.*

Sow polyanthus and primrose seed early in the month, and, if the weather is mild, sow hardy annuals, such as adonis, alyssum, prince's-feather, love-lies-bleeding, snapdragon, yellow balsam, candy-tuft, catchfly, small blue convolvulus, devil-in-a-bush, hawk-weed, Indian-pink, larkspurs, lavatera, mignonette, moonwort, nasturtiums, pansy or heartsease, sweet pea, persicaria, scabious, sunflowers, strawberry-blite, ten-weeks'-stocks, sweet-sultan, Venus'-navel-wort, &c. Autumnal flowering bulbs, as meadow-saffron and tiger-flower, may be planted, if they have been taken from the ground. Balsams, China-asters, marvel of Peru, and purple convolvulus, may be sown in pans indoors, but will succeed better if sown in a hot-bed.

IV. APRIL.

The heat of the weather rises on an average about six degrees in this month, though half a dozen or more frosty nights usually occur. Although it rains in general very often, a circumstance useful for the young crops sown in February and March, evaporation is very greatly increased, and the ground in consequence becomes rather drier than wetter.

1.—*Kitchen Garden.*

Flat-hoe and stake the first-sown peas ; and when the weather continues very dry, water the first-sown seed-beds. The kinds of seed mentioned last month, if they have been

neglected to be sown, must be sown the first week. Besides beets, broccoli, particularly Cape broccoli, Brussels sprouts, kale, German greens and savoys for winter, succession crops should also be sown of salads, &c., every second week. A full crop of potatoes may be planted towards the beginning of the month, and kidney-beans, particularly scarlet-runners, both seeds and roots, saved from last year. Prick out celery and lettuce, and sow more. Plant savoys and Vanack cabbage-stumps for sprouts. Hoe and weed carefully where necessary, for "ill weeds wax weel," and do much injury. Divide and plant out sweet herbs. Water newly-planted things in dry weather.

2.—*Fruits.*

Insects, which are about this time hatched from eggs firmly glued to trees, &c., though absurdly supposed to be generated by what are called *blighting* winds, must now be destroyed in their infancy by hand-picking, particularly on currant-trees. Choice trees may be protected, as they show blossom, from the bleak winds, by netting, thick canvas, &c. ; such materials should always be moved, however, on mild days. The thinnest gauze net is quite sufficient.

3.—*Flowers.*

Towards the end of the month, divide the roots of hepaticas. Sow seeds of Brompton stocks, tiger-flower, and annuals, to succeed those sown in March. Sow also biennials. Plants in pots should now be kept as much out of doors as the weather will permit. Be careful to destroy the green fly on the rose-trees by washing with tobacco-tea, and the "worm in the bud" by hand-picking.

V. MAY.

The air is nearly in its driest state this month ; and though the weather is becoming gradually warmer, some severe frosty nights occasionally occur, and do great injury. The approach of these should be watched at nightfall or bed-time, and due protection given where wanted. In the mornings, thaw off hoar frost by a slight watering, to supply the heat, which otherwise would be drawn from the plants if thawed by the sun.

1.—*Kitchen Garden.*

Hoe and stake peas ; hoe beans and early potatoes ; prick or plant out cabbages, lettuce, celery, and other crops which require this treatment. Succession crops of most vegetables may also be sown, and a full potato and scarlet-runner crop planted, if not done last month. Sow endive and broccoli. Hoeing, thinning out, and weeding, must also be attentively performed, particularly with carrots, parsneps, and onions, or they will never grow fine. Watch carefully at night, as well as early in the morning, snails and slugs on young lettuces, cabbages, scarlet-runners, &c.

2.—*Fruits.*

Insects will now require to be very carefully attended to, otherwise the entire crop may be destroyed by them. Every leaf that is observed with holes in it, or gnawed, or puckered, should be examined, as well as the branch on which it grows, where the depredators often lurk while not feeding, such as the magpie caterpillars of currant-trees.

3.—*Flowers.*

Turn geraniums, fuchsias, verbenas, hydrangeas, and other similar plants, out into the borders about the end of the month, where they will grow much finer than in the pots. Weed and thin annuals and other seedlings ; and prick out or transplant others that may require it. Successive sowings may also still be made ; and at the beginning of the month tender sorts may be removed to the open air, though it will be much better to wait till the end of the month. Destroy insects on rose trees.

VI. JUNE.

This is the driest though not the warmest month in the year, for towards the beginning there is usually some cold weather, particularly at night ; but towards the end of the month the heat of the weather does not vary so much.

1.—*Kitchen Garden.*

Watering must now be attended to in dry weather in the evenings, or very early in the mornings, or both, for too much water at this season can seldom be given to freshly-

planted crops. Weeding and thinning out are also of the first importance, as well as hoeing, particularly with potatoes, cabbages, and peas. Celery, endive, leeks, savoy, broccoli, and New Zealand spinach, ought to be planted out, and fine plants of curled parsley, and curled cress, for seed. The chief sowings for full crops are endive, Swedish or Aberdeen yellow turnips, repeating the sowing, if destroyed by the insects called jumpers; also scarlet-runners, after watering the ground; sow some early York and sugar-loaf cabbages, in the first and again in the third week. Where the early potatoes come off, plant Vanack cabbages for collards or lettuce. Stake scarlet-runners and peas. Clear the beans and spinach of the black dolphin, and cabbages of the grey aphid, by picking off the parts affected.

2.—*Fruits.*

Place netting over the currants and cherries to keep off the birds. When the weather is dry, water the trees planted in autumn or spring, as all their roots are not yet accommodated to their new situation. Strawberries, more particularly, require an abundant supply of water; the flower-stems of the alpine sort should be cut off. Insects and slugs must be carefully destroyed as already directed.

3.—*Flowers.*

Tall flowers should be neatly supported with stakes to prevent their being broken. Ranunculuses in flower should be shaded. Carnations should be top-dressed, and, when coming into flower, should be shaded. Earwigs are now the most troublesome insects, and are readily entrapped in lobsters' claws stuck upon sticks, or in hollow canes. Bulbs which have ceased flowering and have their leaves faded, should now be taken up. Annuals may be thinned out, and the thinnings transplanted into vacancies in the borders. Hydrangeas, African lilies, and forget-me-nots, in pots, require water twice a-day.

VII. JULY.

The dry weather of June usually gives place, towards the middle of the present month, to a good deal of rain, which may, as in the East, be called the "latter rain."

Hand-watering, of course, is in such circumstances no longer necessary in the open ground, though plants in pots, owing to the heat of the weather drying up their moisture quickly, require to be freely watered.

1.—*Kitchen Garden.*

When the early potatoes come off, sow turnips in the ground, treading in the seed slightly with the feet. Or, plant in trenches in this ground some rows of celery and leeks, and also savoys, German greens, and Vanack cabbages, for collards, to come in early in winter. Scarlet-runners and French beans may still be sown in the two first weeks for a late crop; and early York, Vanack, sugar-loaf, and dwarf cabbages in the first and in the last week to be planted out before winter or early in the spring; also endive, turnip-radishes, lettuces, and spinach for a late autumnal crop. Take up potato-onions, and shallots, and cut sweet herbs, when in flower, to dry in the shade for winter. Prick out celery and the first crop of endive. Grub up weeds to prevent them seeding.

2.—*Fruits.*

Grub up suckers at the roots of currants, gooseberries, and lilacs. Destroy insects, and scare off birds from the ripening fruit. Alpine strawberries must be watered when necessary.

3.—*Flowers.*

Ranunculuses, out of flower, may be taken up; and any bulbs not taken up last month. Sweet-Williams, carnations, and pinks, may be struck by pipings or layers; and the roots of polyanthes, double primroses, and auriculas, may be divided and planted in the last week. Biennial and perennial seedlings, sown in March, may be planted out. Cuttings of geraniums, &c., may be struck about the end of the month, to stand the winter.

VIII. AUGUST.

The warm nights, which now occur in consequence of the heat imbibed last month being evaporated from the ground, render the weather uniformly warmer than in July, though the days are shortening. There is also more dry

weather now, and watering, therefore, becomes important, wherever it may be required.

1.—*Kitchen Garden.*

The seeds of onions, or of any other vegetables which are ripe, should be gathered, dried, and cleaned, preparatory to their being placed in paper in a dry situation, till they are required for sowing. The bulbs of onions should also be taken up as soon as the leaves are withered, and stored in a dry shed for winter use. Welsh onions, for use in spring, may now be sown, and York and Vanack cabbages about the ninth, or, in the neighbourhood of London, as near as possible to the twenty-fifth of this month. Hoe and thin out turnips, and sow more, as well as radishes, lettuce, mustard and cress, and, in the first or second week, narrow-leaved, or rather Flanders broad-leaved spinach. Begin to earth up the first-planted celery and leeks, and plant out some more to come in later. Sow, as in last month, and for the last time, some seed of white turnips, Spanish and turnip radishes, and plant out savoy and imperial or Vanack cabbages of the June sowing, for collards. Broccoli must be planted for spring, and well and frequently watered. Search for and destroy insects, particularly caterpillars.

2.—*Fruit.*

Late-bearing strawberries should be watered, and towards the middle or end of the month, the larger offsets may be planted out, if not before pricked out and nursed: bud-grafting, when the bark rises well, may be performed. To preserve the fruit of gooseberries and strawberries, the later sorts should be shaded with mats.

3.—*Flowers.*

Sow auricula and polyanthus seed in pots, to be kept protected in winter. The roots of auriculas may now be divided, as also may those of sweet violets, the former to be potted into small pots, and the latter to be planted where desired. Cuttings of geraniums, and other tender plants, which have struck root, should now be placed singly into small pots, to be kept through the winter season in the house. Take up anemone roots.

IX. SEPTEMBER.

Though the weather is usually fine this month, it becomes sensibly colder; and more so about sun-rise and in the day-time than at night. Watering will seldom now be necessary, except with plants in pots.

1.—*Kitchen Garden.*

Endive and lettuce may be planted out on beds sloping to the south-west, and trenched round to drain off water. Cabbage for collards in November, savoys, and German greens, may be planted out early in the month, though it becomes rather late, as well as for sowing lettuce; but radishes, mustard, and cress, may be sown every fortnight. Hoe and clear the ground about turnips, and prick out the August-sown cabbage-plants early in the month, to be afterwards planted out in October.

2.—*Fruits.*

In the first and second week, plant strawberries, taking up and throwing away the old stools, whether mule or barren, and those which have twice borne fruit; the beds may now be slightly top-dressed with a light rich soil. Destroy wasps, earwigs, and slugs.

3.—*Flowers.*

Carnations and pinks, which have been struck from pipings or layers, may be planted out, if rooted, either in pots or in the open ground. Plant bulbs: monthly roses may now be increased by cuttings, and other roses and sweet-briar by layers. If old plants of roses are cut down to an inch from the ground, they will sometimes send up shoots, which may blow towards Christmas if kept in-doors or otherwise sheltered, and even in the open ground if the season be mild. Sow tall larkspurs, Adonis, and other hardy annuals, to stand the winter.

X. OCTOBER.

Moisture and cold now increase rapidly; and cold nights, not unusually frosty, particularly near London, about the tenth, announce the approach of winter.

1.—*Kitchen Garden.*

Peas and mazagan beans, for an early crop, may be sown in an exposed (not a sheltered) situation, to render them hardy, and more capable of enduring severe weather in the winter; but they are often destroyed when sown at this season, if they are not amply protected through the winter months. Horse-radish may now be planted, and also lettuce and endive, as directed last month, while full-grown plants may be tied up to blanch. Earth up celery in dry weather, and hoe savoys, leeks, &c. Transplant the cab-bages of the August sowing, and any other greens the planting of which had been neglected last month. Cut off the tops of parsley to make it sprout new leaves, and when the weather is very severe, protect them with straw or other light and dry material.

2.—*Fruits.*

Plant cuttings of gooseberry, currant, &c., and the old trees, as well as most other fruit trees, may be pruned when the leaves fall, though perhaps it is better to defer this operation till the month of January; young trees may also be transplanted, taking care to water them if the weather be dry.

3.—*Flowers.*

Plant the dry roots of anemones and ranunculuses, and the bulbs of hyacinths, crocuses, and tulips, if not done before; and, in pots, Guernsey and bella-donna lilies to flower next year. Dahlia roots should have their crowns protected from sudden frost, by four inches of leaves or tanner's bark. Protect layers and young plants of carnations from frost and too much wet. Potted plants must always be taken in-doors at night, and also during the day in cold weather.

XI. NOVEMBER.

The increasing moisture in the air, and the greater degree of cold, render fogs frequent; and at night particularly, the growth of most plants receives a considerable check, though, so long as sharp frosts hold off, the hardier sorts make a little progress.

1.—*Kitchen Garden.*

Plant rhubarb in rows, and cabbage-stumps for sprouts in spring, or seed in summer. Early peas may be sown at the hazard of losing them : the success of beans is more probable. Dig up vacant ground as roughly as possible, or lay it in rough ridges. Endive and lettuce may now be blanched. Take up roots of scarlet-runners, and keep them in sand.

2.—*Fruits.*

Prune cherry, plum, gooseberry, and currant trees, and dig in some good well-rotted manure about their roots. Cut down the old stems of raspberries, and shorten the young ones if necessary. Plant every description of fruit-tree early in the month.

3.—*Flowers.*

Take up dahlia and marvel-of-Peru roots, and preserve them through the winter in a dry situation. Plants in pots ought to be set out of doors in the more mild days, but always taken in at night. Keep them rather dry than moist, as any superabundance of moisture at this season is very injurious to them. This is the great season for planting shrubs and trees.

XII. DECEMBER.

The cold becomes gradually greater, particularly at night, and vegetation is consequently rendered nearly torpid.

1.—*Kitchen Garden.*

When the peas or beans sown in the previous months begin to appear above the ground, throw over them a slight covering of earth ; or, if they have escaped attention till too high for this, draw earth close up around the plants with the hoe. Everything likely to suffer from the frost, such as young cabbages sown late for spring planting, ought to be well protected with mats when they can be had, and when not, with straw, fern leaves, or long dry dung. Potato-onions may be planted in the last week.

2.—*Fruits.*

Prune, if not done before, gooseberry and currant trees; and, in the south, this is the time to prune vines which are trained to walls in the open air.

3.—*Flowers.*

When hydrangeas, fuchsias, and other half-hardy flowers, are left in the borders out of doors, their roots ought to be well protected with long dung, ashes, fern leaves, &c. Plants in pots ought to be kept as dry as possible; and, as wet out of doors is, in general, more destructive than frost itself to many plants, cover, in wet weather, auriculas, &c., which may be placed in the open air.

E. THE SUCCESSION OF CROPS.

It is of the utmost importance, in point both of profit and convenience, to have as little of the garden vacant as possible; and by means of deep digging, plenty of manure, and a judicious selection of crops, every corner may be kept bearing, except during winter, when the ground intended for spring crops may, in heavy and wet soils, be thrown up in ridges; but this practice is found by Mr. Lee to injure light and stony soils.

The winter-dug grounds will be ready to receive scarlet-runners by the end of April or the beginning of May, and cabbages, either of the autumn or the February sowing.

The spring crops of peas and beans sown from February to the end of April may be succeeded by cabbages sown in June, to come in early in winter or in spring.

The ground that has been occupied by spring crops of carrots, parsneps, and onions, may be planted in October with cabbages, the seed of which had been sown in the beginning of August.

The winter crop of celery may be succeeded in March with autumn-sown cabbages, or with onions and carrots.

The spring crop of early potatoes and radishes may be succeeded with lettuce or early York cabbages, or with turnips or spinach. The later crop of potatoes, planted in April or May, may be succeeded in autumn with savoy or German greens.

A volume might be filled with similar directions; but enough may be learned from this brief notice, and from what has been more fully detailed in the body of the work, to guide the inexperienced till the capabilities of the soil to bear a particular series of crops are discovered.

INDEX.

A

	PAGE
ACCIDENTS of cultivation	41
Agents which affect plants	9
Air	11
Air cells	7
Alkalies	18
Amaryllises	179
Ammonia	17
Anemones	159
Animals, injurious	44
Annuals, hardy	144
Annuals, transplanting	148
Apple trees	99
April	184
Artichokes, Jerusalem	56
Asparagus	70
August	188
Auriculas	154
Azaleas	120

B

BALM	84
Balsams	178
Bay	106
Beans	88
Beet	55
Begonias	167
Biennials, hardy	140
Blanching endive	82
Blanching plants	10
Blights	18

PAGE

Blue red wood	124
Borecole	76
Box trees	106
Broccoli	77
Broom, common	120
Brompton stocks	148
Brussels sprouts	77
Budding	37
Bulbs, hardy	186
Bulbs, tender	179

C

CABBAGES	71
Cabbage roses	115
Cactuses	177
Calceolarias	178
Calendar of garden work	181
Camellias	174
Canker in trees	48
Carbon	11
Carnations	155
Carrots	58
Cauliflowers	78
Celery	65
Chamomile	84
Cherry trees	101
Chervil	84
China roses	118
Chinese chrysanthemums	182
Chives or Syze	65
Circulation of the sap	8

	PAGE		PAGE
Clays	15	Endive	81
Climbing annuals	151	Espalier apple trees	99
Climbing shrubs	122	Evergreen shrubs	105
Coal ashes for blanching celery	67	Evergreens, planting	106
Cockscombs	178	Evergreen thorn	122
Cold	9		
Columbines	131	F	
Conveniences	42	FEBRUARY	182
Corms, hardy	136	Fennel	84
Corn salad	84	Fermentation	17
Cresses	82	Fig marigolds	178
Crocuses	140	Florists' flowers	152
Crops, succession of	193	Flowering	39
Crowns of roots	26	Flowers	103
Currant, red	98	Food of plants	9
Currant, white	98	Forcing rhubarb	70
Currant, black	97	French beans	90
Cuttings, striking of	30	Frozen plants, treatment of	40
		Fruiting	39
D		Fruits	91
DAHLIAS	161	Fuchsias	173
Daphnes	111	Functions of leaves	8
December	192		
Deciduous shrubs	112	G	
Dew	12	GARDENING Societies	180
Dextrine	47	Garlic	63
Diseases of plants	43	Gases imbibed by plants	11
Division of roots	25	Geraniums	172
Dog-tooth violets	140	German flower-seeds	152
Dolphin aphid	89	German greens	76
Double furze	111	Golden rod	132
Double primroses	131	Good King Henry	80
Draining	19	Gooseberries	94
		Goose foot	80
E		Grafting	36
EARLY peas	86	Grape vines	102
Early potatoes	51	Guano	18
Earthing up celery	67	Guelder roses	120
Electricity	13		

H		L	
	PAGE		PAGE
HALF-HARDY annuals	176	LABURNUMS	120
Hawthorn	120	Laurel	106
Heartseases	163	Laurestine	111
Heat	9	Lavender	84
Heaths, hardy	110	Layering	28
Heaths, tender	173	Leaves	71
Hedges	121	Leeks	64
Heliotropes	173	Lettuce	80
Hoeing	42	Light	10
Holly	106	Lilacs	120
Hollyhocks	143	Lilies	139
Honeysuckle	122	Lime	17
Humin	22	Liquid Manures	18
Hyacinths	157	Lupins, annual	145
Hybridisation	25	Lupins, perennial	132
Hydrangeas	176		
Hyssop	84		
		M	
		MANURES	8
		March	183
		May	185
		Mezereon	113
		Mignonette	150
		Mineral substances	16
		Mint	85
		Monkey flowers	175
		Musk plant	176
		Mustard	84
		Myrtles, striking them in water	36
		N	
		NARCISSUSES	139
		New Zealand Spinach	80
		November	191
		O	
		OCTOBER	190
		Oenotheras	143
		Offsets	27
I			
	PAGE		
IMPLEMENTS	42		
Inarching	37		
Insects, injurious	44		
Irises	140		
Ivy for hiding walls	124		
J			
	PAGE		
JANUARY	181		
Japan kerria	120		
Japan quince tree	120		
Jasmine	123		
Jerusalem artichoke	56		
July	187		
June	186		
K			
	PAGE		
KALE	76		
Kidney beans	90		
Kitchen vegetables	47		

	PAGE		PAGE
Onions	61	RABBITS	46
Operating on ground	20	Radiation	9
Organs of plants	2	Radishes	59
Oxygen	11	Raking	21
		Ranunculuses	159
P		Raspberries	94
PANSIES	163	Rats	46
Parsley	84	Red cabbage	75
Parsneps	55	Red spider	45
Pear trees	101	Rhododendron	109
Peas	85	Rhubarb	68
Perennials, hardy	128	Ridging ground in winter	15
Periwinkles	111	Rocambole	63
Petunias	176	Rock plants	135
Pinks	155	Rock roses	110
Planting apple trees	99	Rockets	143
Planting cabbages	73	Roots	48
Plants in pots	166	Roses	115
Plum trees	101	Rosemary	84
Poles for climbing roses	127	Rotation of crops	41
Polyanthuses	155		
Poppies	147		
Pores of plants	6		
Portugal Laurels	106	S	
Potatoes	48	SAGE	84
Potato disease	52	Sap of plants	8
Potato onions	64	Savory	84
Potting plants	166	Savoys	76
Pricking out cabbages	73	Scarlet runners	90
Pricking out celery	66	Scarlet vervain	176
Primroses	181	Scotch roses	119
Principles of rearing flowers	104	Scurvy grass	83
Privet for hedges	112	Seed lobes	24
Propagating	22	Seeds	85
Protecting	40	September	190
Pruning apple trees	100	Shading	40
Pruning climbing plants	125	Shallots	63
Pruning roses	116	Sheds	43
Pruning of plants	8	Shelter	40
		Shrubs, flowering	105

	PAGE		PAGE
Slugs	45	Training climbing plants	123
Snails	45	Transplanting	132
Snapdragon	142	Tree onion	63
Snow	41	Trees, low deciduous	114
Snow-drops	140	Trellises	124
Soils	14	Trenches for celery	67
Sorrel	84	Tuberous-rooted perennials	136
Spinach	78	Tulips	157
Spiræas	120	Turnip fly	58
Spongelets	5	Turnips	57
Staking perennials	133		
Standard roses	117		V
Standard trees	121	VERBENAS	176
Starworts	132	Vines	102
Strawberries	91	Virginian creeper	124
Strawberry tree	106	Virgin's bower	123
Striking slips	30		
Succulent plants	177		W
Suckers	29	WALLFLOWERS	131
Sun roses	110	Water	12
Sweet briar	119	Water cresses	82
Sweet herbs	84	Watering	21
Sweet peas	150	Weather	13
Sweet William	130	Weeping trees	121
Syringas	120	White beet	56
Syze	65	Whortle berries	110
		Window gardening	166
		Winds, shelter from	40
		Windsor beans	88
		Wire for trellises	125
		Wistaria consequana	124
			Y
		Yew trees	112

T

TECOMA radicans	124
Thyme	84
Tiger flower	137
Tools	42
Trailing plants for pots	179
Training apple trees	99

LONDON:
BRADBURY AND EVANS, PRINTERS, WHITEFRIARS.





